

UC-NRLF



QB 70 154

YC 60235

LIBRARY
OF THE
UNIVERSITY OF CALIFORNIA.

Class

GENERAL



A MANUAL
OF
EGYPTIAN FARM CROPS
AND VEGETABLES

By G. BONAPARTE
School of Agriculture, Ghizeh.



Printing Office J. POLITIS. — Cairo.

1903

PREPARE

A MANUAL

OF

EGYPTIAN FARM CROPS

AND VEGETABLES

By G. BONAPARTE

"
School of Agriculture, Ghizeh.



Printing Office J. POLITIS. — Cairo.

1903

SB99
E5B6

EGYPTIAN LAM (S092

AND VEGETABLES

GENERAL

IN THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

OF THE

PREFACE

The subject I have undertaken is an extensive one, and its detailed treatment would require a much larger treatise than the simple « Handbook » I now offer to my readers.

My chief object, however, is to give, not a full account of the methods of cultivation practised in Egypt, but the main points of interest concerning the more important « Farm crops and vegetables » grown throughout the Country.

About 85 different species, comprising nearly 100 varieties, are mentioned in the text.

These are all briefly described, and their modes of cultivation, times of planting and harvesting, as well as their chief economic uses, are indicated; I have also given, in each case, the Latin, English and Native names.

In reading the vernacular names, the letters, a, i and e, are as in « far » (Ex : Dakar), « pit » (filfil) and « met » (bersim).

G. BONAPARTE.

Ghizeh, May, 1903.



ADDENDA & ERRATA

At page 6, 10th line from top, for « 90 » read « 96 ».

At page 16, for « *Capsicum annuum* » read « *C. frutescens*, (Filfil Akhdar baladi)

Most of « *Capsicum Roumi* forms » belong to the species « *C. grossum*.

At page 21, 13th line from top, after « flesh » insert (f).

At page 24, for « Yfota » read « Yiota ».

At page 29, for « Artichoke » read « Globe artichoke. »

At page 31, after « *Daucus carota* » insert « and *D. maximus* » ;
var : (a) *D. maximus* ; var : (b) *D. Carota*.

At page 38, after « *Hibiscus esculentus* » insert « and *H. praecox* » ;
var : (a) *H. praecox* ; var : (b) *H. esculentus*.

At page 60, under « Sugar cane » ;

« Baladi » ; probably a native stock.

Roumi « abiad » ; introduced from « Otaheite ».

Roumi « Ahmar » and « Mikhatat » ; introduced from « Bourbon ».



The Egyptian farm crops and vegetables.

Allium Cepa. Arb : Bassal; Engl : Onion ; Order : Liliaceæ.

I: *Varieties*: (a) Saïdi, (b) Beheri, (c) Shamy or Abiad, (d) Roumy or Helou.

II: *Method of propagating*; By seed, which should be fresh and of superior quality 1 1/2 — 2 kadahs per fdn. or about 2 kirats of seedlings.

III: *Time of planting*; September.

IV: *Time of transplanting*; Usually in 11 and 12 (River banks and Islets in Upp. Egt.) and in 12 and 1, as late as 2 (Land under canal system in Upp. and Lr. Egt.); First case, planted on the flat, either singly in rows 35 cm. apart or in small groups, these being in rows, 50 cm. apart. Second case, planted on ridges, both sides, 60-65 cm. between their tops and 15 cm. between the plants.

V: *Time of harvesting*; 4 to 5 months after transpl. according to the locality, kind of soil, time of transpl, etc. The crop is at its best in April (U. Eg.) and in April and May (L. Eg.)

VI: *Number of crops*; One.

VII: *Chief uses of the plant*; Eaten raw, used for culinary purposes and made into pickles; The plant contains an acrid volatile oil, which acts as a stimulant, diuretic, and expectorant. The bulbs are used externally as rubefacients, particularly in allaying rheumatic pains, and when roasted as a poultice. Considered as hot and pungent — described as aphrodisiac and carminative as well as emmenagogue, when raw. Believed to promote appetite and sexual desire. — The juice rubbed on insect-bites is said to allay irritation etc.

VIII: *General Remarks*; The onion grown in Egt. is the « Red Spanish » distinguished by its comparative mildness and its size. Both (a) and (b) var: are red, the former being of a larger size forming the great bulk of the export crop — it is largely made into native pickles; grown in the Saïd. The var: (b) is superior in flavour and

keeping qualities — chiefly consumed locally ; grown in Lr. Egt ; Occasionally a white var (c) is grown as well as the « Giant red Rocca of Naples » (d) both to a small scale.

Deep loam, inclining to sandy — thoroughly worked and well stocked with humus ; liberal manuring. Better use Sebach Baladi or f. y. m. average 70—75 hemlas per fdn ; applied 30—45 days after transpl. (canal system) and during transpl. (River banks) ; No water on River banks ; usually no water is necessary before manuring and during the 25 last days of ripening (Canal system) ; promptly harvest at maturity — produce varies from 50—160 kantars aver : on good land 100—120 k. Aver : price 15 P. T. per kantar.

Green onions (Bassal Akhdar) may be obtained at any time from sets of bulbs — harvest — after 40 days.

Seed is obtained by planting either whole bulbs or sets of them about 12 — harvest 4 months later.

Allium porrum ; Kourrat ; Leek ; Liliaceae.

I : (a) Abou-Shousha or Common Leek (b) Baladi.

II : Both by seed.

III : End of January.

IV : (a) Beginning of 7 ; on ridges, both sides ; 60—65 cm. between the ridges and 15 between the plants. (b) not transpl. but broad-casted in beds.

V : (a) begins 3—3.5 months after transpl. and may continue till the end of 12.

VI : (a) One ; (b) Occupies the land for 1 or 2 years, generally one ; first case 12—15 cuttings ; second case 24—30. It requires four months to run into seed, generally from June to October.

VII : (a) Bulbs and lower portion of leaves eaten cooked. (b) The leaves, which possess a somewhat onion taste and smell are eaten raw as a relish.

VIII : (b) does not develop a valuable bulb ; it is of a comparatively smaller growth not attaining the size of var : (a) ; the leaves are succulent and much narrow. The two first cuttings are of a little value the leaves being narrow and coarse — generally they are not eaten.

A light loam is necessary — liberal manuring in the form of S. Baladi, particularly in the case (b) ; copious waterings are also wanted.

Allium sativum ; Thom ; Garlic ; Liliaceæ.

I : None ; However the garlic of L. Egt. is superior to that of Upper.

II : Sets of bulbs, bulbels or cloves (foussouss).

III : Beginning of 9 to end of 12 ; best time 11. On ridges, both sides — distance between ridges 60 — 65 cm. and between the plants : 15 cm. About 100 okes of bulbs are required per fdn.

V : Five to six months after planting.

VII : Bulbs are eaten cooked or raw, as a seasoning, condimental and flavouring agent. Considered antispasmodic, emmenagogue, stimulant, diaphoretic, expectorant, diuretic, tonic, carminative and aperient when exhibited internally ; Externally it is applied as rubefacient chiefly in spasmodic affections — It owes its medicinal properties to a volatile oil, it contains.

VIII : A rich light loam — no much water required — in the «basins» and river banks, it is raised on the flat without any water at all ; no much care in cultivation.— The crop is valued at about £ 14.— Bulbs or cloves ought to be fresh each possessing a portion of the disc.

Andropogon sorghum ; Doura Baladi ; Indian or Great millet ; Gramineæ.

I : There are many va. grown, particularly in Upp. Egt. with white, yellow or red grain. The white var. are always preferred by natives producing a better-looking bread. Among the white var : the most important are two : viz : (a) The Beda (var : ægyptiacus), with glumes varying in colour from yellowish to dark yellow. (Chitwi crop) and (b) The Simmel-Abd (probably, var : bicolor), with black shining glumes (Sefi crop).

Two crops of this millet are distinguished viz : (1) The Summer, Sefi or (Gedi, in the Basins) (2) The winter, Chitwi, Nili or (Nabari, in the Basins).

However the local names applied to this valuable crop, are many, of the most varying and generally misunderstood. Often the two crops are known under the name of «Doura Sefi» and in other cases, particularly in Upper Egt. under the name of D. Awega. Further, the term Awega is only applied to those forms of *Andropogon sorghum* which possess dense and dropping panicles, the colour of the grain being not taken into consideration.

II : By seed — on flat — either in holes about 35 cm. apart and 4 — 6 seeds to the hole or dropped in behind the plough, only each alternate furrow being sown. Four to 5 Kadahs of seed are required.

III : Summer crop : 15th of March to 15th April ; Winter crop : August.

V : Summer crop : beginning of 8 ; winter crop : End of 11 or beginning of 12.

VII : A staple food in Upper Egt ; made into bread after being mixed with a certain amount of Fenugreek or Helba seed at the rate of 6 kadahs per ardeb (6 : 90 parts), for the purpose of making bread more palatable — Seed contains about 70 % starch and 9 % albuminoids, yielding a larger amount of flour than an equal bulk of «Maize» ; it is largely used for feeding poultry. It is often made into a kind of native beer or Bouza. Stalks are largely used for fuel. — The grain is reckoned heating and may be malted into whisky.

VII : Best soil a rich light sandy loam. The crop is very exhaustive and requires heavy applications of manure, chiefly in the form of Sebach Coufri. The crop when too thick ought to be thinned and in the case of planting in holes, not more than 2 plants left in each, when the plants are about 35 cm. high.

The plant cannot thrive without a regular application of water. — The produce varies much, depending mostly on the water, manure and time of sowing. The Summer crop produces the most grain — Average produce on good land is equal to about 10 ardebs.

Apium graveolens ; Karafs ; Celery ; Umbelliferae

I : (a) Baladi — a poor and coarse form with great many thin leaf-stalks — white. (b) Faransawi or Roumi with few but stout and succulent leaf-stalks — white.

II : By seed — germinates slowly — sown broad cast — bed should have perfect surface tilth be moist — and well manured.

III : December and January.

IV : The seedlings are delicate — require about 5 months, after the seed is planted, to mature sufficiently for transpl. — generally in June — 60 cm. between the ridges and 35 between the plants.

V : Begins in October.

VII : The green leaves and stalks are used as an ingredient in soups

and as a flavouring agent, etc, in pickling. The leaf-stalks are cooked as a vegetable — When properly blanched they are boiled and served like Asparagus.

Celery is considered alterative, diuretic, emmenagogue, stimulant and carminative — generally is considered a wholesome pot-herb.

VII : Celery likes a rich light moist soil — it requires the very best of cultivation — liberal manuring and watering.

To obtain fine quality and appearance the plant should be pushed to as rapid a growth as possible. If allowed to become stunted, the stalks will be knotty in appearance and bitter in taste. Celery when badly grown is rank, coarse and almost unfit to eat ; when blanched it acquires a mild and agreeable flavour, the stalks are sweet, crisp and juicy.

Blanching is accomplished by gradually excluding the light. The operation consists of gradually earthing up the plants as they grow and continue until only the very tops of the leaves are visible. Better commence earthing up when the crop is about half grown — Tie up the stalks before you start.

Arachis hypogaea ; Foul Soudani ; Ground, Earth or Pea nut.

Leguminosae ; Fam : Papilionaceae.

II : By fruit (legume or pod) ; unhusked.

III : 15th of 3 to 15th of 4th.

V : Eight months later — November — Great care is recommended in harvesting — don't pull the plant without loosening the earth at the point where the fruits penetrate the ground.

VII : Locally the nuts are mainly consumed in a roasted or parched condition. They contain about 45 % of a clear yellow oil ; non-drying ; edible, bearing a great similarity to olive oil. It has a pleasant nutty flavour and smell, keeps for a long time without becoming rancid.

It is used for culinary purposes, as a salad oil, soap-making, lubricating, etc. As a lamp oil it burns long, but gives a less luminous flame — Largely used as an adulterant and substitute of olive oil — In Egypt the oil is not extracted.

Nuts are highly nutritious ; besides oil, they contain about 24 % of albuminoids. They are used in confectionery — in chocolate making, etc. The oil-cake is well adapted for stock.

VIII : A sandy loam — not moist — not much care in cultivation — no deep cultivation of the soil is required — however a friable condition of the surface soil is indispensable.

3 Rob of seed per fdn ; usually grown in holes on the flat ; about 60 cm. between the holes and 1 or 2 fruits in each hole. Produce depends much on the quality of seed used.

No manure is required and but a small care in after-cultivation.

As regards water, much is necessary, particularly at the beginning.

The fruit ripens into the soil — the average produce is about 10 ardebs.

Leaves and stalks, chiefly when green, are greedily eaten by stock. It is an excellent fodder.

Asparagus officinalis ; Koshk Almaz or Halioun :

Asparagus ; Liliaceae.

II : By roots ; one or two, better one year old. Planted in well prepared and heavily manured beds — On flat, 30 cm. between the sets. Beds usually 2 m. by 10.

III : January.

V : During the second year after planting — from March to July ; finest crop in April and May.

VII : It is the most delicate vegetable known — Its culinary preparations are few. It is best boiled and served alone — It is well preserved in tins when boiled. It is esteemed diuretic and recommended for renal disorders.

VIII : The Lower stems or better the young shoots of this lilaceous perennial plant are extensively eaten as a vegetable all over the world and to a small extent by natives in Egt, although they cannot cultivate it so successfully as in Europe. Generally the shoots are poor, thin and small in size ; the succulence and tenderness, two things which determine the quality of this vegetable, being wanting. — The shoots are generally used in their green or unblanched state.

No vegetable will better repay careful culture and generous feeding. The Asparagus is a gross feeder, requiring a considerable quantity of well-rotted dung — It will grow in any soil that is well cultivated but a deep, moist, rich, sandy-loam is the most suitable.

Thorough drainage is necessary ; this may be accomplished by placing about 1 foot thick, of clinkers, under each bed.

A coating of well-rotted f. y. m. is required every year the best time for its application being January.

A plantation of Asparagus, well looked after, can keep for long, but 10—15 years, is a fair average term. The old stems should not be cut the first year after planting; during the subsequent years, however, they must be cut down during October and November.

Shoots must not be left to reach more than about 4 inches, above ground, as they soon lose their tenderness and become bitter. Cut them with a special knife 3 or 4 inches beneath the surface.

Beta vulgaris ; Bangar ; Beet ; Chenopodiaceae.

I : (a) Bangar-el-Soukkar (Sugar-beet), with more or less conical root.— White. (b) Bangar Ahmar or B. Salata. (The common Egyptian round red), with a deep red round root. The former is grown for sugar and the latter as a salad plant.

II : By seed.

III : (a) Two crops, viz : Sefi or Summer — February to May — Chitwi or Winter — August to beginning of October. (b) At any time : best 15th of August to 15th of October — also in March.

IV : (b) when about 40 days old — on ridges — 60 cm. between the ridges and 35—40 between the plants.

V : (a) 6—7 months after planting ; (b) 2 months from transplanting.

VII : (a) Grown for sugar manufacture — In addition to sugar, alcohol may also be prepared. (b) Grown for its root and leafstalks — used for garnishing dishes — as a salad — makes an excellent pickle in vinegar — It is wholesome — cooling — relishing nutritive and digestible.

VII : Generally speaking the crop is hardy and easy to raise. There are no special difficulties — A loose deep rich soil is necessary, a rich light loam being the best — too much manure causes a rank growth and must be avoided.

(a) Sugar beets are not suitable for garden culture — Great care must be paid in selecting a proper var. for your locality — Good seed and true to its kind must be carefully looked for. Generally the roots should not be fanged and in good var. the skin is white and the flesh firm and white, with a large number of close concentric rings of vascular

bundles. Beets with upright leaves and long petioles are always less rich in sugar than those with leaves which lie close to the ground and have shorter petioles.

In Egypt, Sugar beet is but of a very recent introduction. From the point of view of quality there seems to be no doubt that the country is well suited for its growth. The average percentage of raw sugar is high (15—16), but as regards the present yield unless it be raised to about 18 or 20 tons, on good land in Lr. Eg., the cultivation of other crops such as maize would be more remunerative.

The period over which sowings may successfully take place in Egypt, is a very extensive one but for the purposes of manufacture it is necessary to have two well defined crops — viz : The Sefi and Chitwi.

The seed is sown on both sides of the ridge, in holes — 2 or 3 seeds in each hole — 75—80 cm. between the ridges and 20 between the holes — later on thinned to one.

No water must be given for about 35 days before harvesting.

(b) This var. is an early one ; it is not left to develop any seed ; the latter is chiefly brought from France under the name of «Betterave Egyptienne».

**Beta vulgaris, var : foliosa ; Salk ; Egyptian Chard beet ;
Chenopodiaceae.**

II : By seed — sown broadcast in beds.

III : From August to end of October, better beginning of October.

V : First cutting of the leaves about one month after sowing, subsequent cuttings once every 20 days.

VI : The plant continues supplying leaves for about 4 1/2 months — generally about 6 cuttings are taken after which it is left to develop its seed.

VII : Leaves are finely chopped and used as a flavouring agent as well as for «greens» in colouring sauce, particularly in the case of, Okra, and Colocassia — Often also cooked as a pot-herb. The root is of no value.

VIII : This form of beet is of the easiest culture — it requires but little care — Liberal manuring in the form of well-rotted dung is necessary as well as frequent waterings, in order that the plant produces an abundant supply of succulent leaves.

**Brassica oleracea capitata ; Koroumb ; The head-bearing,
true or garden Cabbage ; Cruciferae.**

I : (a) Baladi. (b) Ahmar or Faransawi. (c) Batta. (d) Mikharfish.

The «Baladi» is a large drumheaded (with flattened spherical head) white var — hardy — the earliest of all — the most extensively grown, but comparatively coarse.

The «Ahmar» is a dwarf drumheaded red var. less hardy than the preceding — comparatively late — chiefly consumed by Europeans — of great demand — not extensively grown.

The «Batta» is the largest of all var. grown in Egypt ; it is a drum headed white var. comparatively later than the ahmar and of great demand — not much grown.

The «Mekharfish» is not a «cabbage proper» but a «Savoy Cabbage» (*Brassica Oleracea bullata*) distinguished from the former by having puckered or wrinkled leaves.

It is a hardy form — large — drumheaded — and comparatively coarse — white and late.

II : By seed, which requires an extra care in selection.

III : June and July (all four var.) ; also end of February, only var : (e) and (d).

IV : Forty to 45 days later on ridges — 3 feet between the ridges and 2 to 2 1/2 between the plants, the distance depending on the var.

V : Five to 6 months after transpl ; continued for about 1 1/2 month.

VII : The dense rosette or head of leaves is used in cooking — eaten raw as a salad — pickled, the best var. for the purpose being the Ahmar or Red. Leaves form an excellent fodder for stock of every sort — not grown in Egypt as a fodder crop.

VIII : A deep well-tilled loam, rather heavy than light — rather damp than dry — must be thoroughly drained — a gross feeder, hence plenty of manure is a necessity — use plenty of f. y. m. — applied before formation of heads begins — frequent and thorough surface tillage as well as frequent waterings. Cut off tips of seedlings in transplanting — harvest as soon as the heads are fully developed — if left for a few days after they will run to flower. To get good seed transplant the root-stocks in a well prepared bed as soon as the heads are cut off.

In all the essential points the Savoy cabbage (d) may be grown like ordinary Cabbage.

Brassica oleracea botrytis cauliflora ; Karnabit ;

Cauliflower. Cruciferae.

I : The var. grown in Egypt may be divided into two, viz : early and late ; they do not differ much in structure etc. as well as in demand for market. The chief var are : (a) Sultani (b) Toubi (c) Amshiri (d) No 3. a) is the earliest of all ; (b) comes next and (c) and (d) the last. The Sultani is, very plentiful from about the middle of December to the 15th of January ; the Toubi ripens from the last half of January to the middle of February and the var : (c) and (d) during the last half of February and part of March.

II : Ry seed which ought to be of the highest quality as inferior seed often produces plants which run to head badly or not at all (arb : Lakhana). Thus it is vitally important that the very best strain of seed is used and probably there is no other vegetable which so quickly runs down from poor seed as the Cauliflower.

III : June and July — Sow Sultani earlier than all the rest.

IV : Forty to 45 days later — on ridges — 3 feet between the ridges and 2 1/2 between the plants.

V : Five and half to 6 1/2 months after transpl. according to the var.

VII : Grown for its fleshy and succulent inflorescence — cooked ; boiled and served as salâd — pickled.

VIII : Managed the same as the Cabbage and requires similar conditions. But it is less hardy in constitution more elegant in appearance and requires more careful cultivation to ensure satisfactory results. It is a difficult plant to grow to perfection — In order that the heads of cauliflower may be white and tender, care should be taken that they are not sun-burned. It is well to tie the leaves together over the head or to break a few of the leaves over it in order to shade it — Cut the head as soon as it is ripe because if left, it will spoil.

Occasionally the so-called Broccoli (*Brassica oleracea botrytis asparagoides*) Arb : Broccoli is grown. This is merely a var. of the Cauliflower, with the same general characteristics, but a hardier constitution. It is chiefly boiled and served as a salad.

**Brassica oleracea Caulo-rapa ; Abou-roukba ; Kohl-rabi ;
Cruciferae.**

I : The var. are chiefly distinguished by the colour of the foliage and form of stem. For all ordinary purposes the green-foliage var. are the best, but those with the purple-foliage are the fullest flavoured.

II : By seed.

III : June and July.

IV : Forty days later. On ridges 65 cm. apart and 45 between the plants.

V : When the swollen stems are from 2—3 inches in diameter—about 3 1/2 months after transpl.

VII : Not grown as a stock food — little used by natives — it proves a most acceptable vegetable among Europeans of the country — chiefly used in soups — when served as a vegetable it has the flavour of a Turnip with a somewhat nutty tendency. The stems ought to be used before they become large, stringy or full of fibres.

VII : Kohl-rabi produces a turnip-like swollen stem. just above the ground. The plant is exceedingly hardy — rich, moist, friable soil — well manured ground — in transplanting, seedlings sought to be planted shallow to encourage the stem to swell above ground — regular waterings — induce a quick growth, otherwise the stems obtained are tough. The almost universal error in using kohl-rabi is to allow the tuberous stems to get too large—Only when partially grown they are soft and palatable.

**Brassica oleracea bullata gemmifera ; Brouksil ;
Brussels sprouts ; Cruciferae**

Grown but little, for its small heads or rosettes produced along the main stalk — Chiefly consumed by Europeans. Generally very poorly grown, through non-recognition of the first principle of success, which is a long growing season.

II : By seed ; a good crop of «Sprouts» is dependent very largely on the strain of seed.

III : June and July.

IV : Forty to 45 days later—in ridges 65 cm. asunder, the plants 45 cm. apart.

V : The earliest sprouts become fit for use towards the end of November and they continue to be produced, improving in quality, through the winter months — It is important to gather the crop in a systematic manner. The sprouts are perfect when moderate-sized, round, close, grass-green, with not a leaf unfolded.

VII : Cooked, also pickled — of great demand — when small and tender, they constitute one of the best and most delicately flavoured vegetables of the Cabbage tribe. It is much esteemed for the table on account of its mild sweet flavour and its rightly appearance.

VII : The treatment for Brussels sprouts is essentially that for Cabbage.— The crop especially late in the season is much suffering from Cabbage Aphis (*aphis brassicæ*) in March.

Brassica rapa ; Lift ; Turnip ; Cruciferae.

I : The most important var : are two viz : (a) Baladi. (b) Faransawi. The former is a white turnip with a purple top. It varies much in shape, the roundish depressed form mostly predominating.

It is chiefly made into pickles mixed with Egg-plant, Cucumber, pod-pepper, onion, cabbage, etc.— It is comparatively coarse and of a low-feeding value.

(b) Is a white flat var. raised from imported french seed and chiefly used for soups, etc.— It is more delicate than the preceding — also of a smaller growth.

II : By seed ; in the case of var : (b) the seed ought to be renewed at least every second year.

III : From September to the end of December — best time month of November. The seed is best sown in drills from 30 — 45 cm. apart depending on the var. But sometimes broadcast sowing answers perfectly, and more depends on timely and judicious thinning than upon any other point in the general management. A good crop cannot be expected without thinning — thin the plants until they stand from 15—25 cm. (depending on the var.), between them.

As a farm crop the native turnip (a) is generally speaking broadcast at the rate of 2 Rob. per fdn.— The seed germinates quickly.

V : Two to 2 1/2 months after sowing — The root is very plentiful during January.

VII : Used for soups — served boiled — made into pickles. The tur-

nip was experimentally tried for feeding stock, in Lr. Egt, but not with much success.

VIII: The finest turnips are grown in deep, friable, moist, rich sandy loam. Much water and f. yard manure are necessary for a good crop; but these two when used in excess cause a rank growth, the root often becoming hollow and sponge-like, inside.

Turnip is one of the easiest and hardiest of all plants to grow. Especially the herbage is very hardy, withstanding considerable cold, etc.

The value of the turnip as an article of food lies very largely in its tenderness and succulence; these two stages are generally attained by securing a quick growth, as the slowly growing plants are woody, stringy and bitter. The land thus should be rich, moist and in fine tilth in order to obtain turnips of superior quality.

Cajanus flavus; Ads or Bissilla hindi; Cajan or pigeon pea.

Leguminosae; Papilionaceae.

II: By seed — On flat — seed is sown in holes about 1 m. apart. 3 seeds, thinned to one.

III: May to July.

IV: About 6 months after sowing the first crop is taken; three months later a second crop is often taken. Occasionally a third crop is obtained.

VII: The pulse is highly nutritive. It is particularly excellent for making soups. It contains about 20 % of albuminoids and 60 % of starch. Leaves and tops are good for fodder and stalks for basket-making and fuel. The pulse is considered hot, but easily digested.

VIII: This is a beautiful perennial (7—8 years) shrub, though under cultivation generally annual (lasting about 10 months). It is about 2 m. high, its cultivation being chiefly confined to gardens. Besides being grown for seed, it is also cultivated as a plant of ornament on account of its handsome yellow flowers.

It prefers a deep light moist soil and although not requiring manure it only attains luxuriance when grown on well fertilized land.

**Capsicum annuum ; Filfil Akhdar or Ahmar ; Pod or red pepper ;
Solanaceae.**

I: (a)Baladi (b)Roumi; The former is a perennial, low, shrub-like form.

The fruits are oblong, pendulous and tapering. They are green and, when ripe, of a beautiful red colour, the acrid properties being only developed in the old fruits. When red the fruit is dried, ground and used the same as Cayenne pepper. The plant is very prolific, and the fruits very hot. (b) of which there are a few forms, produce comparatively larger fruits — with much milder characters. They are annuals and comparatively low. These are obtained from imported seed and are much less prolific.

The *Capsicum conicum* var: *Oriente* (Arb: Shatta) is occasionally grown — the fruits are small and red when ripe. Extremely hot and pungent — largely used as Cayenne pepper.

II: By seed-which ought to be fresh.

III: July.

IV: 40—50 days after planting, on ridges 2 1/2 feet between the ridges and the plants 50—70 cm. apart according to the var. (a) requiring more space. Transplant when seedlings are about 15—20 cm. high.

V: About 60 days after transplanting — The best and most of the fruits are obtained during October and November. The growth is checked from about December the 15th to beginning of February and a second crop is taken in April.

VII: Their use in cookery is incidental; however the milder and larger forms are often cooked stuffed with rice, etc; eaten raw when green but chiefly made into mixed pickles before they are over ripe. When red the hot forms are ground up into a fine powder and used the same as Cayenne pepper for flavouring, etc: When red, capsicums may be put on strings, and hung up in a dry store-room for later use, as required — Condimental and in native medicine considered stimulant and stomachic. Externally it is used as a rubefacient in rheumatism — also in the case of haemorrhoids both externally and internally — etc.

VIII: A light, moist rich soil is necessary. It must be heavily charged with humus in the form of f. y. manure.

The Baladi, although perennial generally speaking it is annual, under cultivation. It requires pruning and manuring before active growth commences, towards the end of February.

**Carthamus tinctorius ; Osfour (the flowers) and Ortoum (the grain) ;
Safflower or False Saffron ; Compositae.**

I : (a) Dakar (corresponding to the var: typicus, of Schweinf.) and (b) Nitaya (var: inermis. Schf.); The former is thorny and the latter smooth or nearly so. However these two forms are never grown separately.

II : By seed ; better in drills at a distance apart of 40—45 cm. Often dropped in behind the plough, each alternate furrow being sown. Occasionally broadcasted. In the «Basins» and River banks it is always sown broadcast. Grown alone 2—3 kelas per fdn. Grown as a mixed crop from 1—1 1/2 kela — always prefer thin sowing, the plant being bushy.

III : Last half in October to end of November — earlier in Upper than Lr. Egt.

V : Picking of the flowers usually commences about the middle of March and is fairly established towards the beginning of April. The florets are picked in the early morning as far as they appear. The picking generally continues till about April the 15. The seed is harvested in May. 50—55 rotolis of dry florets and 3—4 ardebs of seed, are obtained per fedn.

VI : Flowers contain 2 colouring matters one yellow (about 30 % of the weight of the dry florets)—soluble in water and useless; the other red (less than 1 %) insoluble in water but soluble in dilute alkaline solutions such as a solution of sodium carbonate — It is known as Carthamin or carthamic acid and principally used for dyeing silks — of the most beautiful dyes but very unstable — Carthamin ground up with starch, talc etc. is used as «toilet rouge» (Hosn youssef). The raw florets are used in native pickling, for colouring soups, ragouts, etc.

The seed yields by cold pressure, a clear and light yellow esculent oil — extensively used locally for culinary purposes, as a salad oil etc, and known under the name of «Zeyt Helou». The seed contains about 30—32 % of the oil but with the native system of pressing not more than 50 rot. are obtained per ardeb of seed. The oil-cake is used for feeding stock. It is not of great feeding value containing much of the seed husks. Poultry and other birds fatten on the seeds — chiefly given to Parrots — The seed is also used instead of rennet in native

cheese-making. Oil is adulterated with that of Cotton-seed — It is very largely consumed by natives.

VIII : Rarely grown alone, generally with Wheat, Barley and Beans. The soil which suits better is a deep light one — not very fertile — not moist. The plant does not require much care in cultivation — very hardy — generally no manure is at all applied — wanting little water — none at all in the basins — generally 2 under Canal system — thinning is indispensable for a good crop. Stalks used for fuel.

**Cicer arietinum ; Hommeus ; (when seed is dry) ; and Melana
(when seed green) ; Common gram or Chick-pea ;
Leguminosae ; Papilionaceae.**

I : No distinct varieties ; however seed-merchants distinguish two forms : viz : The «Dakar and the «Nitaya» ; these two merely constitute a single var. Seed of superior quality being reckoned as Nitaya and that of an inferior quality as Dakar.

II : By seed ; broadcasted or dropped in behind the plough.— 4—6 kelas fer feddan.

III : From last half in October to end of November ; generally earlier in Upper Egt.

V : The Melana, about 4—4 1/2 months after sowing ; the Hommeus, after 5 1/2—6 months.

Three to six, average 4 ardebs of seed and about 3 Hemlas (600 okes) of Tibn or straw per fdn.

VII : Seed not used for stock ; — chiefly roasted ; — cooked and excellent for soups — used in native confectionery and in adulterating coffee — the straw is, but of little value, chiefly used for camels, goats etc. also in brick-making — The seed is eaten fresh, raw (Melana) ;

The dry seed contains about 19 % of albuminoids and 53 % starch, considered good for acidity of the stomach, in cases of flatulency, dyspepsia and diarrhoea.

VIII : Egyptian Chick peas are comparatively poor in quality. The soil for the plant varies from the heaviest clay to the lightest loam, provided it is deep and fertile. It does not require a fine tillage — no manure and but little want for water ; none is at all given in the Basins and River banks ; generally 2 in land under Canal System. More seed is required in the Basins, also when the crop is intended to be used in a green state or Melana.

**Cichorium intybus ; Siris, Loubbeyn or Radikia ;
Chicory or Succory ; Compositae.**

II : By seed ; sown in beds either broadcast or in drills one foot apart.

III : The seed may be planted in succession from 9 to 12, October and November being the best months.

V : The plant affords more than one cutting or crop of leaves, the latter being cut when about 6 or 8 inches long. The first crop is taken after about 1 1/2 month from sowing. The plant runs to seed about 8 months after sowing.

VII : As it is grown here, the leaves are coarse and much bitter ; never blanched.

The blanched leaves constitute an excellent winter salad — slightly bitter — wholesome and delicious — The young tender root may be boiled and used as carrot. — The same when washed, dried in a kiln, roasted and then ground to a fine powder, is mixed with coffee to flavour it ; also used as a leading adulterant and often as a substitute for coffee — When largely used, it has a tendency to produce diarrhoea. Made into salad and eaten raw as a relish. — The plant is considered tonic, demulcent and cooling.

VIII : This plant is familiar to many as weed particularly among « Bersim ». It has a long carrot-like root — milky juice and beautiful blue flower-heads — It flourishes on any kind of soil except however on stiff-clays and light sands — the best soil being a deep, moist rich loam. Plenty of water is necessary and when the plant is grown for its root, deep ploughing is recommended — no much care in management the plant being hardy etc.

Cichorium Endivia ; Hindiba ; Endive ; Compositae.

II : By seed.

III : From September to December ; it may also be grown late in February and beginning of March.

IV : Thirty to 35 days after sowing on ridges—Distance between the ridges 60 cm. and 30 cm. between the plants — both sides of the ridges.

V : Two and half to 3 months. average 80 days after transplnt.

VII: The blanched heart-leaves are made into salad — Excellent and wholesome; considered resolvent and cooling.

VIII: It is badly blanched by natives and generally bitter and tough. The blanching is an important process, and is variously performed. The customary mode is to tie the leaves together a little below their tips, and a few days later about the middle of the plant; In 2 or 3 weeks they are found sufficiently blanched for use. The blanching must be carried on in such a way as to ensure a succession without a glut at any time, for when sufficiently blanched Endive should be used, or it will soon begin to rot. Blanching must begin when the plants have attained nearly their full growth.

In the case of Endive, the selection of sorts is a question of importance, because the handsome curled var. that make the best appearance on the table, are the very best salads; being tender, and with a fresh nutty flavour. The var. grown in the country is the «Curled» (Chicorée frisée, of the French) with crispy much-cut leaves — raised from imported french seed.

The plant is hardy requiring a rich light soil — both water and f. y. manure are indispensable as it is essential for endive to make a quick and succulent growth in order to be at its best.

Citrullus vulgaris ; Battikh ; Water melon ; Cucurbitaceae.

I: Many var. are grown but only few worth notice. The most important of these are :

(a) The Yaffawi or Jaffa; (b) Baladi; (c) Kharroubi; (d) Kafrawi or Borolloussi; (e) Saïdi (falsely called Akkawi, from Akka in Syria) and (f) Souefi or Beni-Souefi.

The first 4 come to maturity early or late in summer and the 2 last chiefly in October and November.

(a) Is raised from seed imported from Syria. It is of a medium size — light green and furrowed outside — nearly round in shape — comparatively late in ripening — flesh red, rich in sugary substances and firm. It is the best var. when carefully treated and of the greatest demand. Although inferior to the imported «Yaffawi» it ranges as the first among the var. grown in the country, requiring a great care in selecting the seed, as seed grown for more than two years in the country, generally produces but inferior fruits. The seed must be

renewed if possible every year. (d) bears a great resemblance to Yaffawi it is nearly equal to it as regards quality and grows to a larger size. Of great demand it is but grown to a small extent in the Gharbich province particularly in the neighbourhood of «lake Burulus». It is comparatively late. (b) This is the most common var. large in size it is the earliest of all. In shape it is nearly round and of a light green hue. Flesh red, rich in water and compared to the 2 preceeding, softer and poorer in sweetness. (c) is chiefly distinguished from the Baladi by being covered with a glaucous waxy bloom—having smaller seeds and being sweeter—also of greater demand. (e) This is an winter sort and the best of winter var. almost round in shape it is of a very dark green colour outside and has a red, firm, sweet flesh. This is a very poor var. chiefly grown in the provinces of Minia and Beni-Souef—it is round—small—light green striped with deep green—red flesh—soft—very juicy and poor in sugary substances. Only but of a small demand.

II: By seed which is soaked in water during about 24 hours, before planting (River banks).

On river banks the seed is sown in holes made on the flat in rows at a distance of about 2 m. between the rows and from 75—80 cm. between the holes. In the case of land under perennial irrigation the holes are dug along trenches, the latter being shallow and used for the purpose of watering the crop. The holes are made to a depth of 30—40 cm. their bottoms being as a rule filled with manure, Columbine (Zibl Hamam) being that chiefly used for the purpose. In such a case the manure not only provides the plant with food but also acts as a forcing bed for the plant to grow; 3—4 seeds to each hole. Thin to 1 or 2 plants for each hole.

III: *Sefi crop*; usually in March; sometimes a fortnight earlier. *Chitwi or Nili crop*; July and August.

V: *Sefi*, begins about 3 1/2 to 4 1/2 months after sowing and continues for about 1 1/2 m.

Chitwi or Nili; October and November.

VII: The fruit is of the most cooling and refreshing during summer—diuretic; digestive.

The skins are often preserved—used for feeding pigs; young fruits are often made into pickles; seeds contain an edible

oil and are largely eaten parched; considered cooling, diuretic and strengthening. Saccharine matter of the fruit cannot be profitably converted into sugar. Juice refuses to be turned into vinegar, etc.

VIII: A precarious crop; particularly early sowings require protection from the North winds.

A light sandy loam — warm but not too dry is its delight — with only a medium of Nitrogen as a surplus of it, chiefly when accompanied by much water, may and generally does, produce larger melons, but at the expense of quality. They will prove soft, watery and insipid and with a small percentage of sugar. Preparation of the land thorough but not necessarily deep. On River banks the crop is raised without any preparation at all and no water. On land under perennial irrigation the land is prepared and the crop watered. The flat dead sound emitted by a melon «when thumbed» is a sign of ripeness, also when it easily detaches itself from the stalk. If the resonance is hollow, ringing or musical, it is a certain proof of immaturity. — No need to soak the seed in water (Land under canal irrigation) — About 2—2 1)2 kadahs of seed per fdn.

Citrullus Colocynthis; Handal; Colocynth; Cucurbitaceae.

Chiefly grown in the desert, often wild and generally imported by the Arabs from the Sinaïc peninsula.

II: By seed; in holes — 1 m. apart between the rows and 1)2 m. between the holes — 3 seeds thinned to 2 for each hole — soak the seed in water for about 24 hrs. when to be grown on River banks.

III: During March.

V: June, about 3 1/2 months after planting.

VII: The fruit which is about the size of an orange, contains an extremely bitter principle (Colocynthin), which is a violent purgative. It is considered as a hydragogue cathartic, useful in constipation, hepatic and visceral congestions, dropsical affections and other cases requiring drastic purgatives. Considered by natives to remove phlegm from all parts of the system. The powdered fruit alone or mixed with an equal amount of black pepper, is used to prevent cloth from the attacks of the «Cloth-moth» (Aetta).

VIII: Same as Water melon.

**Colocasia antiquorum ; Colocass ; Taro, Tania, Eddoes,
Egyptian Colocassia ; Aroideae.**

No var. that of the Menoufieh province particularly : Shanawan being the best.

II : By sets or divisions of tubers, each division possessing at least one good eye.

The sets are planted in holes, low down on the ridges, at a distance apart of 85 cm. between the ridges and about 50 cm. between the plants — The amount of tubers required per feddan varies from 5—12 cantars (The weight of cantar generally being 300 rtl), with 8 as an average.

III : Beginning of April.

V : Eight to ten, average 9 months after planting. The crop may keep long in the soil, after it is ripe, if the soil is kept in a dry condition.

VII : A perennial herb, annual under cultivation, grown for its edible tubers ; often it is grown as a plant of ornament for its handsome heart-shaped leaves.

The tubers are eaten as a vegetable ; they contain an abundance of excellent farinaceous matter — Previous to cooking they ought to be repeatedly washed in order to separate a mucilaginous substance they contain in abundance. The acrid substance found in them is dissipated by the process of cooking. Leaves are not eaten by stock ; being dried they often are used as an adulterant to tobacco, with which they bear a great resemblance, when chopped. The pressed juice of the petioles is styptic and may be used to arrest bleeding.

VIII : Chiefly grown in Lr. Egt ; highly prized by natives and of the most paying crops — generally a farm crop — It requires a sandy loam with an abundance of organic matter in it. Heavy manuring in the form of f. y. manure ; abundance of moisture ; thorough cultivation and drainage — Careful after-cultivation — earthing up about 2 months after planting — As the plant takes long to raise up, plant with it a catch-crop such as, French Beans, cucumber, etc. Produce, about 100 cantars per fdn. on good land.

Corchorus capsularis ; Yfota ; Jute proper ; Tiliaceae.

Both the *sp. capsularis* and *olitorius*, furnish the well known « Jute fibre » ; The former produces the most, the latter being chiefly cultivated as a pot-herb. The « *olitorius* » is but grown to a limited extent as a textile plant and is comparatively smaller.

II : By seed which is either broadcasted or better sown in drills, close together, as it is desirable that the plants should grow erect, and only produce a minimum of side branching which interrupts the length of the stem fibres and reduces the value of the crop.

III : From April the 15th to the 15th of May.

V : In October, about 5 months after sowing. If the harvest is delayed strong lignification sets in and the fibres become dark and brittle. By delaying harvesting the total crop is increased but the fibre being brown and strongly lignified is of a less market value. It is from late reaping, with plants in seed, that coarse jute is obtained, the crop yielding the best fibre, though comparatively weaker, if cut during the flowering period.

VII : Grown for its fibre (obtained from stem) ; when young used as a pot-herb. The fibre is largely used for carpets, curtains, shirtings as well as for imitating silk fabrics and as a substitute for hemp. Weak var. are suited for making paper. Best qualities are of a pale clear yellow or buff colour, with a silky lustre, easily spun and comparatively strong.

VIII : Only experimentally grown in the country — small extent — It thrives well under our climate and is most productive upon well cultivated, thoroughly manured and regularly watered, loamy soils. The fibre is separated by the process of retting in pools of stagnant water. The time required to complete the process varies, but usually comes between 10—12 days — Great care is required in retting as when the fibre remains too long in water, it becomes rotten and almost useless — Produce 3 — 3 1/2 tons of raw fibre per fdn.

Corchorus olitorius ; Molokhiya ; Jew's Mallow ; Tiliaceae.

II : By seed which is broadcasted in well prepared and heavily manured beds.

III : At any time between end of January and beginning of October. It does not grow during the winter months.



V : Beginning 35—40 days after planting.

VI : Up to 7 cuttings may be got from one crop, once every about 25 days.

However, as a rule after the 3^d cutting, the crop begins to deteriorate — the supply of leaves is lessened as well as the quality — the leaves becoming coarse and small.

VII : The plant is not grown for fibre, the latter being inferior in quality and shorter compared to that obtained from the species «Capsularis».

The most esteemed of the native pot-herbs ; chiefly made into a kind of soup, the leaves being finely chopped, boiled in broth and seasoned with garlic. The leaves are often dried for winter use. The plant is very rich in mucilage and is considered nutritive and emollient. However it is difficult to digest.

VIII : Often found wild. It is most productive upon loamy soils. It requires a thorough cultivation but especially heavy manuring, in the shape of well rotten animal dung, as well as plenty of water, the number of cuttings, quality of produce, etc. chiefly depending on these two items. Apply manure if possible after every cutting.

The plant requires about 2 months to run into seed, the latter being generally obtained in November. The seed is recognized from that of the preceding species in being of a beautiful green colour, that of «Jute» being brown.

Cucumis melo ; Shammam ; Sweet Melon ; Cucurbitaceae.

I : Many var. are grown but only few are of some importance, viz :

(a) Baladi ; (b) Bassoussi ; (c) Santawi ; (d) Doumeri.

Of the above four the 2 first are the most important.

(a) Is a more or less oblong melon, furrowed or not — the earliest of all and the most common.

(b) This is an improved sort of Baladi chiefly grown in Bassous and Abou-el-Gheit, in the province of Galioubieh. It is of a great demand and excellent in quality. Later to ripe than the Baladi it is generally distinguished from the latter by being almost always furrowed outside, with deep furrows and prominent lobes — the skin and flesh are comparatively firmer the latter being richer in saccharine substances — more fragrant as well of a more delicate flavour — compared to Baladi.

(c) is a small spherical and late var. not much grown.

(d) is larger than the preceding, round in shape chiefly grown about Alexandria — not of great value — comes late in season.

An early form of melon (*Cucumis melo* var. *chate*) known locally as «Abdillawi or Agour is also largely grown. It is the earliest of all — fragrant — the flesh soft and juicy — Oval with somewhat tapering ends — rugged outside and poor in saccharine substances sometimes being entirely destitute of sugar. It is eaten alone or with sugar.

II: By seed sown in holes, same as water melon except that it is planted less deep and at a distance between the rows of about 1 1/2 m. ; about 2—2 1/2 kadahs of seed per fdn.

III: In March.

V: Harvesting takes place some days earlier (about a fortnight) than in the case of W. melon — 3 to 4 months according to the var. In the case of agour only about 2 1/2 months.

VII: Cultivated for its fruit which is delicious and nutritive—Cooling and diuretic. The amount of sugar in it varies according to many circumstances, chiefly depending on the var. grown. It is either eaten by itself or with sugar and sometimes with pepper.

The oily seeds are used as a cooling medicine, they are nutritive and diuretic.

VIII: Very extensively cultivated on the sandy banks of the Nile. As soon as the alluvium-banks are exposed by the falling of the river, operations commence by making maize or millet stalk fences in order to protect the plants from north winds and the inroad of drifting sand.

Soil, manure and other particulars see under W. melon.

***Cucumis sativus* ; Khlar ; Cucumber ; Cucurbitaceae.**

I: The var. grown in Egypt (Baladi) is a trailing one with comparatively small, cylindrical, smooth, green fruits, very prolific and excellent in quality when properly grown. Occasionally a small, green, tuberculated form (Cornichon of the French) is also grown, chiefly used for pickling by Europeans.

II: By seed. On the river banks it is grown on flat in rows. On land under perennial irrigation holes are dug along shallow trenches, the latter being used for watering the crop. Distance between rows or trenches 3 1/2—4 feet ; distance between holes 1 1/2 foot.

Four seeds to each hole, later on thinned to two seedlings ; 2 1/2 kadahs of seed per fdn.

III : Two crops viz : Sefi, sown in March and Nili, in July.

V : The Sefi in May, two to 2 1/2 months after sowing ; Nili, 45—50 days after sowing.

The plant continues producing for about 35—40 days.

VII : Eaten raw and served raw as a salad ; made into pickle either by itself or mixed with peppers, egg-plants, turnips, onions, etc. The fruit is of the most cooling. In sunstroke, pieces of the fruit are applied to forehead to neutralize heat. A cooling pomade is prepared from the fruit used both in medicine and as a cosmetic. Seeds oily and edible.

VIII : Cucumbers will thrive in any good soil not extremely heavy nor sandy. Best sandy loam. Like all the cucurbits it requires a hot and strong manure, pigeon dung being the best for the purpose. Plenty of water and manure are necessary to ensure a quick and succulent growth. On river banks fences are necessary to protect the young plants from north winds and drifting sands. For all other particulars look under W. melon.

**Cucurbita maxima ; Araa Stamboulli or Aassali ; Great Gourd
(Pctiron of the French) ; Cucurbitaceae.**

I : The var. grown in Egt. is generally oblong in shape more or less constricted about the middle. It is reddish yellow outside, the flesh being firm, sweet and of the same colour as the skin.

II : By seed ; On river banks on the flat in rows ; Land under perennial irrigation on trenches, the latter being used for irrigating the crop. Distance between the rows or trenches 7—8 feet ; distance between the plants 2 1/2—3 feet ; 4 seeds to each hole, thinned to 2 seedlings.

III : At any time except during winter months. Best sowings are made in March and July. Sowings may also be made in April.

V : Harvesting takes place 5—6 months after sowing ; the fruit is plentiful in August, November and December. When mature it will keep for many months if hung up in an airy place.

VII : Chiefly when boiled it is a pleasant and wholesome article of food — Nutritious it is often made into preserves by natives— often sold in bazars cut up into slices. The boiled pulp is often used as a poul-

tice — seeds are oily and largely eaten along with those of the following species. The seeds of both are supposed to possess anthelmintic properties and are especially used in cases of Tape-worm.

VIII: The plants require protection during December and January as they are very sensible to cold and frost. Regular waterings and plenty of f. y. manure. See under W. melon.

Cucurbita pepo; Araa Kossa; Vegetable Marrow;

Cucurbitaceae.

I: Two var. are grown viz: The green (Akhdar) and the white (Abiad); both are oblong and cylindrical in shape — more or less ribbed — only differing in the colour of the skin, the one being green while the other is white. The former is the more esteemed, being of superior quality and making a better show.

II: By seed; treated like the preceding.

III: Like the preceding; sowings in spring may continue till end of May and in summer till end of August.

V: Begins 50—60 days after sowing and continues for about 1 1/2 month. Be careful in collecting the fruits not to touch the very young ones as they will soon die and rot.

VII: The most important of the gourds used as an esculent. The fruits are best when eaten quite young and not over-cooked, the flesh being then tender, and the flavour remarkably sweet and nutty. Excellent when boiled and served as a salad. The young tops are often used for the same purpose. The flowers are also cooked, stuffed with rice. The pulp is used for adulterating butter.

VIII: Same as preceding.

N.B.— Cucurbits, particularly when young, suffer much from a yellow beetle, feeding on the leafage and very often being extremely injurious. The pest is called, *Raphidopalpa abdominalis* (arb: El-Hamra).

Cynara cardunculus; Cardon; Cardoon; Compositae.

The cardoon grown in Egypt is obtained from imported French seed. It is but grown to a small extent and only eaten by the Europeans.

II: By seed; ridges 3 feet apart, putting in 3 or 4 seeds at intervals of about 2 feet in the ridges. Thin to one plant at each station.

III : Month of August.

V : About 6 months after sowing, in January.

VII : Cultivated for the sake of the blanched leaf-stalks and mid-ribs of the inner leaves (chard), which are used as a salad, in soups or more generally as a boiled vegetable : It is a wholesome esculent from which a skilful cook will present an excellent dish. The flowers, after being dried, as well as the seed, possess the property of coagulating milk. Used instead of rennet they produce a comparatively inferior quality of cheese.

VII : A perennial but treated as annual under cultivation — A near relative of the Artichoke it differs in taller more prickly growth and smaller heads. A rich loamy soil — thoroughly worked and well stocked with f. y. manure. Should have abundant moisture supply, for it must make continuous and strong growth. When the leaves are nearly full grown, in December, they are tied together near the top and earth is banked against them. This is to blanch the plant, for it is inedible unless so treated.

Cynara scolymus : Kharshouf or Kharshofali ; Artichoke ;

Compositae

II : Generally it is obtained by suckers (Khillfa) which are freely produced about the crown of the plant. 3—4 kerats of suckers are required to plant a fdu. Ridges 3 feet apart and the same distance between the suckers. Suckers should be planted when about 1 foot high ; put them rather deep and tread in firm.

III : August and September ; better early.

V : Begins 4—5 months after planting — plentiful in January ; picking continues during 2—4 months ; it depends on many circumstances and generally the earlier the suckers are planted the longer the plants keep harvesting.

VII : Cultivated for the sake of the immature flower-heads, the receptacle or «Bottom» of the head being the most important part. The flower-stalks when tender are also eaten and the hearts often blanched after the manner of Cardoons and used for the same in cooking. Heads ought to be picked before the flower expands, they are best served, boiled. Not much eaten by natives. Dried flowers and seed have the property of curdling milk.

III: A stout-growing hardy perennial usually declining after it has borne 2 or 3 heavy crops. It is therefore advisable to replant it every fourth year. In permanent plantations before any active growth commences, beginning of November, the decayed stems and leaves are removed and the crop heavily manured.

A deep, moist, rich soil, better loamy, is requisite for the production of large, fine fleshy heads. Liberal manuring in the form of well-rotten dung and plenty of water, except when the crop is at rest, from about April to November. It is one of the most paying crops.

Cyperus alopecuroides ; Samar baladi ; The foxtail sedge ;

Cyperaceae.

II : By suckers obtained from old stocks. About 2 kerats of suckers per fdn.

III: From beginning of April to the end of July. As a rule two crops are grown the one early in April, harvested in July and the next in July, harvested in November.

V : Four months after planting.

VII : (a) It grows to assist the reclamation of salt land, requiring for its growth a large amount of water which in a great measure completes the sweetening of the land.

(b) Grown for its stems, generally 2—5 feet high, which are largely made into mats, the best mats being made from the long stems.

VIII: This rush-like herb is chiefly cultivated in the Charkieh province. A perennial herb, generally annual under cultivation. It is cultivated instead of either Rice or Dinaeba in salt lands of bad quality. It will grow on very salt lands where rice or dinaeba will not and though it requires a large quantity of water and must be kept continually wet, it does not require as much as either Rice or Dinaeba and can withstand a longer rotation. It resists better to drought as well as to want of continual draining, without being harmed. It is a paying crop the average produce of a fdn. of good Samar being from 40—50 kantars, realizing an average net profit of about £ 7.

Daucus carota ; Gazar ; Carrot ; Umbelliferae.

I : (a) Baladi (b) Roumi.

The former is a long-rooted var, of a dirty crimson-red with a light-yellow centre, generally poor and coarse but richer in sugary substances than the Roumi. This is an acclimatised if not an indigenous stock and chiefly eaten raw. (b) Is represented by more than one form, raised from annually imported seed. Among the sorts grown the most common are : The « Short horn » and the « Half long » both yellow in colour.

II : By seed which ought to be fresh and either broadcasted or sown in drills one foot apart. The seeds are small and germinate slowly — Thin the plants where thickly grown and unless the soil is in good condition and free of weeds the young plants are likely to suffer.

III : At any time except during summer. However the main crops are sown in the case of (a) in October and November ; in the case (b) October and November as well as in February.

V : Carrots mature rather slowly and even the early var, require about 2 1/2 — 3 months to bring them to edible size. Usually they are fit for use 3 — 3 1/2 months after sowing — If the roots are transplanted for seed (Baladi) the plant occupies the soil for about 5 1/2 months.

VII : Variouslly used in cookery. In soups, stew, etc. The root of the Roumi is often pickled and that of Baladi chiefly eaten raw and often preserved. — The plant not grown in Egypt for feeding stock — The root is occasionally roasted and used as an adulterant for coffee. Spirit is often distilled from the root — tops afford a useful fodder for stock — The root is nutritious and reputed laxative — used externally as a poultice. Oil from seeds is used medicinally.

VIII : A deep light soil is necessary ; better a sandy loam, friable and in the very best mechanical condition. Water is necessary, but there is no great want for manure.

The Roumy sorts are not left to develop seed, the latter being imported. The Baladi is annual often grown for seed as a mixed crop with Barley.

Panicum crus galli ; Dinaeba ; Barnyard grass ; Gramineae.

I : (a) Sultani (b) Sabeïni.

The former is of a more luxuriant growth. Keeps the soil for about 6 months and generally cut twice. The Sabeïni is less luxuriant, occupies the land for a period of about 3 months and cut only once.

II : By seed, broadcasted at the rate of 1 1/2 Kelas per fdn.

III : May, for the Sultani and August, for the Sabeïni.

V : In both cases, Sultani and Sabeïni, the first cutting is taken about 2 months after sowing. The second cutting (Sultani only) about 50 days after the first.

Seed in the case of Sultani is taken after 6 months and in the case of Sabeïni, after 3.

VII : Dinaeba is chiefly grown in Behera and Fayoum provinces as the first crop after washing salt land, with the object of assisting the sweetening process, as it requires for its growth a large amount of water. It ought to be preferred to rice, as it is very hardy, much more so than rice, resists better the action of salts, and costs but little to grow, its successful growth being a sure indication of the state of the land. At the same time, it provides young stock, during summer with an excellent and abundant green fodder. The seed is not made into bread ; it is often used for feeding poultry.

VIII : A coarse, tufted annual grass, its favourite habitat being a wet ground, particularly drained ponds and marshes. A very troublesome weed among rice.

Eruca sativa ; Garguir ; Garden Rocket ; Cruciferae.

II : By seed, broadcasted in beds.

III : The seed may be sown at any time except during summer. However even in summer the plant may be successfully grown under the shade of trees. Thus the plant may endure the most hot weather if grown in a well shaded and moist place. In summer the plant rapidly runs to seed.

V : The first cutting is obtained after about 35—40 days after sowing ; Subsequent cuttings are taken once every about 20—25 days.

Thus if sown in August about 10 cuttings may be taken till April the first, after which the plant is left for seed, in May. However it is advisable to frequently renew the crop as generally speaking old plants produce very pungent and strongly piquant leaves.

VII : Grown for its leaves which are eaten raw as a relish or seasoned raw as a salad. When old, particularly when in flower, the plant has a strong peculiar and almost disagreeable smell and taste : but when very young it is much less piquant the peculiar smell of the old leaves, being almost imperceptible. Seeds contain an edible oil which is not extracted in Egypt. The plant is prized for its antiscorbutic, depurative and aphrodisiacal properties.

VII : Loamy soil — well stocked with animal dung — frequent waterings, particularly in hot dry weather to insure rapid, vigorous growth should result in succulent, mild-flavoured leaves.

Euchlaena (Reana) luxurians ; Rayana ; Teosinte ; Graminæae.

II : By seed ; sown in holes 60 cm. apart and 2—4 seeds in each hole. On the flat.

III : From March the 15th to the middle of May, April being the best month.

V : The plants grow very rapidly and the first cutting is taken about 2 1/2 months after sowing. From 3 to 5 crops could be obtained from one planting, by cutting before allowing it to flower, once every about 2 months. From 9—10 months are required by the plant to develop its seed.

VII : Grown as a green fodder, for its leaves and stalks, during summer. It may be regarded as one of the most prolific forage plants known. It produces an excellent and enormous amount of herbage, greedily eaten by stock of all kinds. The seed is shining, hard and not eaten.

VIII : The plants usually attain a height of 8—12 feet, tiller out greatly and require a thoroughly cultivated, rich, moist, loamy soil. Liberal manuring in the form of l. y. manure and an abundance of water. The crop is very exhaustive. About 1 kela of seed is required per fdn.

**Foeniculum vulgare var: dulce; Fenoukia; Finochio or Sweet
fennel; Umbelliferae.**

II: By seed, which is broadcasted in a well prepared seed-bed.

III: During September and October.

IV: Transplanted 1 foot apart on ridges which are 2 feet apart. Transplant when the seedlings are about 1 month old.

V: The plant comes to maturity quickly and is harvested 2 1/2—3 months after transpl.—Plentiful in December.

VII: The bases of the crowded leaf-stalks are much thickened, making a bulb-like enlargement above the ground. These are blanched by earthing up like celery and eaten boiled or raw. They are sweet, less aromatic than those of «Common fennel» and very agreeable. The oily fruit also has an agreeable odour and flavour being a favourite aromatic condiment. It is used as a carminative and aromatic stimulant. It is prescribed in colics, diarrhoea and dysentery. The vegetable is chiefly eaten by the Europeans.

VIII: A rich, moist, light soil is required; best a sandy loam well stocked with animal dung in the form of well rotten f. y. manure.

Gossypium; Cotton; Cotton plant; Malvaceae.

I: There can be no doubt that the great majority of Egyptian cottons may be referred to the species «Barbadense» sometimes called the «American cotton species».

In dealing with Egyptian cottons only from an agricultural point of view, the races cultivated in the country may be reduced to only four which are the most important viz: (a) Mit-Afifi; (b) Ashmouni; (c) Abbassi; (d) Yanovitz.

(a) Is undoubtedly the most extensively cultivated form in Egt. Discovered about the year 1883, it is comparatively of a large growth and hardy. In yield, it ranks first amongst Egyptian Cottons, ripens relatively early; its fibre being brown in colour, long and strong, always meets with a ready sale, and commands a good price. Easy to gin and pick, good qualities yield on an average 105 or 106 rottolis of fibre per kantar (i. e. 315 rtl) of raw cotton.

(b) Though at one time largely grown in Lr. Egt. it is now chiefly confined, and grown extensively in Upper Egt., particularly in the

Fayoum and Beni-Souef. It is much older than Afifi, the fibre brown in colour, but of a lighter shade than the preceding. It is an early var., much affected by variations of temperature. The fibre suffers in length, though its strength is fair. The result of ginning is also unsatisfactory, for good qualities, yield only, some 90—95 rtl. per kantar. The seed is the most valuable of all var. being clean. It is considered the richest of all in oil. The value of the fibre is less than Afifi.

(c) This var. resembles Afifi, from which it was derived. However it is not quite so hardy only growing well in certain favoured districts, in Lr. Egt. The crop is easily affected by fogs and adverse climatic conditions, during maturity. The fibre is of a beautiful white colour, fine, silky and very long. It is weak in parts, particularly the 3^d picking, and generally not as strong as Afifi. It is rather difficult to pick and gin the yield per kantar being on an average from 105—106 rtl. The first picking is very superior to that of the preceding varieties and the price ranges higher than any of the above two.

(d) This is a quite new var. obtained by good selection of seed. It has a very silky and long staple, finer than Abbassi and also rather stronger. It is not of the whiteness of Abbassi; its colour is white but has a slight approach to the brown. In spite of its low yield in ginning it continues to be grown and this as well as superior classes of Abbassi, compete with the fine qualities of American cotton. The yield per fdn. is also low but this disadvantage is compensated by the quality. It is of the greatest demand and realizes the highest price.

Only grown in some favoured districts in Lr. Egt.

Among the above named var. «Afifi» takes the leading place in the market. Together with (c) and (d) it is chiefly sailed to England while (b) chiefly goes to Russia and Continent.

II: By seed, which ought to be fresh. On ridges the seed planted in holes. Distance variable; on good cotton land, holes 40 cm. apart on ridges which are 90 cm. far. 8—12 seeds, steeped in water or not. Holes 6—8 cm. deep, about 1/3 far from the top of the ridge. Germination, under favourable conditions, in about 10 days; 3 kelas of seed per fdn.

III: Varies from about 15th of February to 15th of April, generally March is preferred. Later as we go north: better sow early.

X: Varies much according to the var. grown, weather prevalent during maturity, locality, etc. generally begins from about September the 15th and ends by the 15—30th of November. 2—4 pickings, generally 3, once every about 25—30 days. The 4th picking known as «Scarto» in the market, consists of short undeveloped fibre, chiefly used for stuffing; It is but occasionally obtained. About 50 % of the total crop is obtained during the first picking, 34 % during the second and about 16 % in the third.

VII: Grown for its fibre. This when fully ripe is a flattened hollow ribbon or collapsed cylindric tube twisted several times throughout its length, and with the outer edges corrugated and indented somewhat similar to a saw. The external qualities to be looked for might be enumerated as follows: Length, fineness in diameter, evenness and smoothness, elasticity and tensile strength and colour; while the internal qualities required are: Hollowness or tube-like construction, natural twist, corrugated edges and moisture. The seed contains from 24—28 average 26 % of oil. Native mills only extract about 35 rtl. per ardeb (270 rtls) of seed. The oil when crude has a ruby red or reddish brown colour; when refined is pale yellow or straw golden. Bland pleasant nutty taste. Chiefly used for burning, lubricating and soap-making, also largely for adulterating other oils, particularly olive. Deposits stearine on standing — Finer brands eaten — comparatively cheap and known as Zeit Otn or Azara.

The seed and oil-cake are fed to cattle, particularly buffaloes. Stalks largely used as fuel.

VIII: Perennial, but annual under cultivation, occasionally bien-nial (Cotn Okr). A deep, rich and thoroughly cultivated soil is required. Very careful after-cultivation and regular waterings. Manuring is necessary, the fertilizers chiefly used being Coufri and Baladi. Artificials were also tried the best results being obtained by using the following formula: 300—400 rtls. of superphosphate, 60—70 of ammonium sulphate and 60—70 of sodium nitrate. Poudrette also gave good returns. Best the «Wet method» of planting (watering before planting); thin to two, 40 (dry method) to 60 days (wet method) after planting.

A cantar of raw Cotton is equal to 315 rtls. consisting of: Seed 200 rtls (about 9 kelas) Fibre 100, loss 15.

Helianthus tuberosus; Tartoufa or Tiffah-el Ard;

Jerusalem Artichoke; Compositae.

II: By tubers, using whole or cut sets with about 3 eyes each; better whole. Plant on ridges; 3 feet apart, between their tops and 1 1/2 between the sets.

III: March.

V: Six to seven months after planting. Tubers may keep long after ripening in the soil if the latter is kept quite dry. Better store for winter in dry sand.

VII: Cooked in the same way as potatoes; In respect of nutritive value it is about equal to Potato. The tuber contains about as much dry matter as that of potato, but includes very little starch, that substance being replaced by inulin (a subst. closely related to starch). Tubers used as a substitute for potatoes.

Tubers are wholesome, have a sweetish mucilaginous taste and are very palatable when young and properly prepared. Old tubers become hollow inside, stringy, losing much of their flavour. The young plant may be used as forage for stock.

VIII: A quite hardy tuberous plant, exceedingly productive, 6—7 feet high, greatly resembling to sunflower. Deep friable loam — plenty of water — no much care in after-cultivation and attention, as to manuring.

Hibiscus cannabinus; Til Baladi; Deccan hemp; Malvaceae.

II: By seed sown in rows, close together.

III: From about the 15th of February to April the 15th, better in March.

V: Usually in November.

VII: It is very rarely or not at all cultivated as a sole crop and most commonly occurs as a border or hedge to fields of Cotton and Sugar-Cane, particularly the former. It yields a somewhat stiff fibre eminently suitable for the coarser textile purposes. The fibre is long, pliant, bright, glossy white but coarse and harsh, chiefly made into cordage for agricultural uses. The fibre may be used for strings, sacs, nets etc. but rarely for cloth: it is considered good for paper-making. No market demand for it.

VIII: Requires a rich loose soil. No much care in cultivation. Quite hardy.

The ripe plants are pulled up by the roots, bundled and steeped in stagnant water. The process requires from 12—15 days according to the temperature of the water, weather, ripeness of the plant, etc.

The stalks are then beaten, the fibre stripped off, carefully washed and dried.

The plants are stripped of their leaves previous to the retting process.

Hibiscus esculentus ; Bamia ; Gombo or Okra ; Malvaceae.

I: (a) Baladi (b) Roumi.

(a) Fruit short and thick — comparatively coarse — chiefly consumed by natives — less adapted for canning and drying. (b) Plant of smaller growth; Fruit longer — comparatively more delicate — higher in flavour — chiefly consumed by Europeans — grown less than (a) and of a greater market demand. Well adapted for canning and drying.

II: By seed; 40—50 cm. apart on ridges which are 85—90 cm. apart. 3—6 seeds to each hole, thinned after about 35 days, to two, stronger seedlings; 6 kadahs of seed per feddan.

III: From March to end of April, better in March.

V: Begins about 3 months from planting and lasts for about 5 1/2 months.

VIII: Much cultivated for the sake of its unripe mucilaginous capsules, constituting one of the most esteemed native dishes, particularly when fresh. It is prepared in various ways and is considered nourishing, emollient, demulcent and diuretic. The young pods make a good pickle; also canned. When very young they are dried for subsequent use in time of scarcity. Old fruits are coarse and stringy. The bast yields a useful fibre, strong, generally long and pliant which is not extracted. Stalks used as fuel.

VIII: A tall hardy herb — requiring a rich deep loamy soil — plenty of f. y. manure and regular waterings. Perennial, it is annual under cultivation, although sometimes the plants are pruned in January for an early crop.

Seed is sometimes roasted and used as a substitute for coffee.

Hordeum vulgare ; Shaeyr ; Barley : Gramineae.

I: Many forms of Barley are grown in Egypt. These may be reduced to two viz:

The (a) Baladi or 4-rowed; (b) The Afranghi or 2-rowed.

The Baladi forms belong mostly to the subsp. «tetrastichum», the var. «pallidum» being the most extensively grown.

This is par excellence the Barley of Egypt; botanically it is characterised by having 6-rows of grain not arranged regularly at equal distances round the rachis. The ears are short and erect and the grain comparatively thin and long — The plant is hardy and has the power of giving moderately good crop on poor soils.

(b) Is represented in Egypt by the «Two-rowed bent or nodding-eared Barley (*H. V. distichum nutans*), to which «Chevalier Barley» and its various selections from it, belong. Botanically it is distinguished by having only 2 developed rows of spikelets, the lateral ones being barren. The ears are long and bending, the grain thick and stout. Plants are somewhat delicate.

II: By seed: broadcasted at the rate of 4—6 kelas, generally 5—6 in the case of ordinary good land.

III: Barley is a winter crop sown generally in the month of November — as a rule earlier in Upper than in Lr. Egt. However it is not too late if sown in December.

V: After about 5 1/2 months — earlier in Upper than in Lr. Egt. The crop is generally cut by means of a hook. Often pulled by hand (when grown on too-light soils); also self-binders are occasionally used. Thrashing is generally done by means of a native «Thrashing-sledge» or Norag. Occasionally «European thrashing machines» are successfully employed.

VII: Native Barley is chiefly fed to Horses, during the dry season, (about 2 rob daily) and to a less an extent to Camels and Mules. It is malted to a sort of native beer called «Bouza». Mixed with wheat, maize or great millet it is made into bread. Arabs often make their bread from Barley alone. The straw which is of a less market value than that of wheat is chiefly used for feeding stock.

Formerly this race of Barley was used in the preparation of malt and beer, and to a slight extent this is still the case; the proteid-content of the grain is, however, frequently too high for the preparation of a good malt. Presently it is employed in the production of Wishky.

The Chevalier grown in Egypt is chiefly used for making beer. It is either used locally or sailed to Europe, particularly England.

Generally speaking Egyptian Barleys show a low percentage of water (about 9 %). The Baladi contains a greater proportion of albuminoids than Chevalier the amount of starch being about equal in both cases (72 %). Medicinally barley is demulcent, cooling, diuretic and easy to digest.

VIII: Chevalier barley is now grown successfully in many parts of Lr. Egt. It is a favourite var. for malting purposes. The ear is long, the grain of a pale golden colour, plump and round at the end, skin fine and mellow. The straw stands up well and the seed weighs about 40 rtls. more per ardeb than the Baladi.

The grain of Baladi generally is poor, long, thin and tapering with a comparatively thick husk. Not fit for malting, as many of the malting qualities are wanting.

Barley delights in a light soil; the plant seems to resist fairly well to salt and is often grown as the first crop after reclaiming salt land. The plant tillers more than wheat but generally produces less straw or tibr than the latter. No much care in preparing the soil and in after-cultivation — little water and manure wanted. Produce varies much, average 10 ardebs, 240 — (Baladi) — 280 (Afranghi) rtls. each, per ardeb, and about 5 Hemlas (1000 okes) of tibr.

**Lupinus Termis ; Tirmis ; Egyptian Lupine : Leguminosae ;
Papilionaceae.**

II: By seed; generally sown in holes at a distance apart of 35—40 cm. on the flat. 4—5 seeds to each hole; plants are but occasionally thinned. In some cases seed is either broadcasted or dropped in behind the plough, particularly when the crop is intended to be ploughed in as a green manure. Amount of seed varies much, 3—4 kelas being the average per fdn. under ordinary circumstances.

III : Generally from end of October to the end of November, earlier in Upper than in Lr. Egt.

V : Usually takes place in April, after about 5—5 1/2 months from sowing. Plants are pulled by hand and when completely dry beaten with sticks to separate the seed.

The amount of produce varies, 4 ardebs being an average.

VII : Lupine seed is highly nutritious. It contains about 30 % of albuminoids but the high amount of fibre present in it renders a good deal of the album. it contains unavaible for digestion. It also contains one or more alkaloids, which are injurious to health, imparting to it its well known bitter taste. The seed is rendered fit for use by the process known as desinbittering, consisting in boiling the seed for about 2 hours and then soaking it in water for about 4 days, the water being changed once a day. Seed is largely used for human consumption. Medicinally it is regarded as deobstruent, alterative, carminative and anthelmintic. In the form of powder it is used as a cooling skin wash, as a dry dressing to acne, as a cosmetic. etc. The seed is believed to counteract the effects of drink, etc.

Stalks are used for fuel.

VIII : Grown on the sandy river banks, edge of canals and pools and in general in waste places unfit for the growth of other crops. Grown for seed and as a green manure crop. Succeeds best on dry sands also on light sandy loams, deep and not too moist. Does not require much care in preparing the land and in after cultivation.

Excellent as a green manure crop. No manure and but small amount of water.

**Indigofera argentea ; Nila Baladi ; Silver Indigo ; Leguminosae ;
Papilionaceae.**

II : By seed ; which should be as fresh as possible. Sown either in holes or better in drills 35—40 cm. apart. About 1 kela of seed per feddan.

III : From March the 15th to the end of April, best first half of April.

V : The plant is a perennial one but generally annual under cultivation. The plants are ready to cut, when the flowers appear. This

will occur in about 3 months from sowing, in July. The plants will soon ratoon and a second crop is taken about 40 days later. Under favourable conditions, sometimes, a third crop is taken after the same delay from the second. Generally only two cuttings are obtained. The plant thus occupies the soil for a period of about 7 months.

The average produce per feddan is from 20—25 okes of the dye.

VII: Indigo is one of the most important vegetable blue dye-stuffs made. The substances which form the dye, reside in the leaves, in the form of a glucoside called «Indican» which by decomposition and atmospheric oxidation, produces the commercial «Indigo blue». Two methods of extracting the dye-stuff are used, viz: The «scalding» and the «fermentation» process. The former is that practised in Egypt, though the latter is to be recommended.

Egyptian Indigo, as it is prepared by natives, is of much inferior quality. It possesses low colouring properties and contains a large amount of various impurities. It is of a dark blue colour not imparted with lustre when rubbed. Comparatively heavy it is not porous; it is difficult to grind.

VIII: The best soil is a rich deep loam. Not too dry and sandy nor too wet and clayey. The land should be prepared in the most thorough manner, if profitable returns should be expected. The crop requires heavy dressings of manure chiefly in the form of Sebach Baladi. The ground must be kept well cleaned of weeds as well as loose and friable. Excess of moisture is very detrimental; however the crop can only thrive on those lands under a good system of irrigation, accompanied by deep drainage.

Ipomœa Batatas ; Batata Helou ; Sweet potato ;
Convolvulaceae.

II: By green cuttings. These are made from the ends of vines. Cuttings usually 30 cm. long, the leaves being removed except at the tip. Planted on ridges about 2 1/2 ft. far and the cuttings are 1 1/2 ft. apart.

III: From beginning of June to the end of August. Better early.

V: Three to 4 months after planting. In the case of an early crop, after the roots are dug up, if the vines are carefully covered, a second crop may be obtained.

VII : The tuberous roots are eaten boiled — also roasted. They are starchy and sweet, have an agreeable taste and contain more nutritious matters than common potato. The root gives a starchy deposit of superior quality sometimes amounting to considerably more than 20 %. The starch may be transformed into glucose and alcohol, the latter being of a mild and pleasant flavour. The leaves and succulent stems make an excellent fodder and are greedily eaten by every kind of stock.

VII : This is a trailing herbaceous plant, rooting at the joints. Grown with but little care even on waste light soils. Best a deep, well-drained, friable, sandy loam. Liberal supply of moisture in the growing season and a less supply when the roots are maturing. The soil ought to be well stocked with f. y. manure. Chiefly grown in gardens and in waste places under the shade of fruit trees, in orchards. The crop is a paying one, the produce per fdn., under favourable conditions, being about 120 cantars.

Lactuca ; Khass ; Lettuce ; Compositae.

I : (a) Khass Latouca or Latouca : *Lactuca sativa* : Garden Lettuce. (b) Khass Baladi : *Lactuca scariola* var : *sativa* : Prickly Lettuce.

(b) This is a tall erect form, bearing a certain resemblance to «Cos Lettuce». The head is erect oblong and only made of few leaves. The inner leaves are sweet juicy and crisp but the outer coarse and acrid. This lettuce is chiefly eaten raw. In some places of Upper Egypt it is cultivated as an oil-yielding plant.

(a) Is chiefly represented by some few Cabbage or Head-lettuces. The outer leaves are more or less spreading the inner ones rolling together into a head more or less round or spreading. The plant is a low one, the leaves less sweet and less juicy than the preceding with a soft and flabby texture. Chiefly served as salad — generally raised from imported french seed.

II : By seed, sown broadcast in a well prepared seed-bed.

III : From 15 of September to end of November, also late in February.

IV : About 30 — 35 days after sowing on both sides of the

ridges ; distance between the ridges 60 cm. the seedlings being from 20 — 30 cm. apart. Baladi requires less space.

V : Two months after transplanting (Latouca) and from 2 1/2 — 3 months (Baladi).

In the case of the Heading or Cabbage-lettuces, the plants may be improved by tying, and in this case the operation must be performed not more than about 10 days, when the plants are nearly 4/5 of their usual size, in advance of the day on which it is intended to pull them.

VII : Lettuce is the king of salad vegetables. It is highly esteemed for its cooling and refreshing properties.— It is easy of digestion — gently laxative and moderately nutritious. It is considered corrective and antiscorbutic. All the species of lettuce, abound in a milky juice, out of which the so-called Lactucarium, is obtained. This is found to partake in a considerable degree, of the qualities of opium. The seeds are oily and those of Baladi contain about 37—38 % of an edible oil which is extracted (Zeyt Helou) ; it is of a light yellow colour, clear, sweet and transparent — largely consumed by natives and often adulterated with cotton seed oil. The oil-cake is eaten by stock.— The leaves of lettuce are often used in culinary purposes.

VIII : Baladi seed is raised in the country.— In order to get good seed the root-stocks ought to be transplanted.

Lettuce requires a mellow, light, moist, rich soil and a quick and continuous growth must be secured from start to finish. Plenty of f. y. manure and regular watering.

Lepidium sativum ; Rashad or Harra (the plant); Hab el-rashad (the seed) ; Garden cress ; Cruciferae.

I : Baladi or plain-leaved ; and Afranghi or curled-leaved.

The former is the most common the latter being best adapted for garnishing. At the same time it is more substantial.

II : By seed, which ought to be thickly broadcasted in a well prepared seed-bed.

III : From beginning of September to end of February.

V : From one planting many cuttings may be obtained if the plant is carefully treated. However, as a rule, after the second cutting

the plant begins to deteriorate. Thus, instead of keeping the same plantation for long, it is best to sow only a small quantity at a time and to keep up a succession of sowings, at short intervals. Besides old plants are more pungent and acrid. The first cutting is taken about 25—30 days after sowing.

VII: This small annual herb with a somewhat mild-flavoured, mustard-like taste, is grown chiefly for its leaves which are used as an article of food, (eaten raw as a relish) and for garnishing dishes. When the plant is young it is mild-flavoured and when old, particularly when grown with but little water, pungent and acrid.

The seed is oily, the oil being very similar to that of mustard. Both leaves and seed are considered as tonic, antiscorbutic, aphrodisiac, depurative and gentle stimulants.

VIII: A light soil, plenty of manure and liberal watering. Keep the plant regularly watered otherwise it will run to flower.— It is important to cut cress when it is just ready, tender, green, short and plump.

**Lathyrus sativus ; Guilban ; Jarosse or Gesse ;
Leguminosae ; Papilionaceae.**

II : By seed which is either sown broadcast or in rows 1 foot apart. About 4—5 kelas of seed are required per fedn.

III: From end of October to end of November, generally earlier in Upper than in Lr. Egt.

V : The fodder is ready for use 60—75 days after sowing ; the seed ripens about 5 months after sowing. The plant gives but one cutting.

VII: This annual herb is chiefly cultivated in the southernmost provinces of Up. Egt. where Bersim refuses to grow. It is grown as a fodder plant for its leaves and stems, the seed being not used. The seeds have been proved to be highly injurious if taken in more than limited quantities, causing a kind of paralysis of the muscles. The pea is however highly nutritious containing about 30 % of albuminoids.

VIII: The plant is very hardy — endures the severest droughts and requires no care in cultivation. In the basins it is simply scatte-

red broadcast, and left to take its chance. Only but little water is wanted and no manure — As regards the quality of soil, only but little care is necessary, as the plant will even thrive on the very heavy clays, hardening to the consistency of a stone. The plant is at its best when in flower ; the straw is of a small value.

Linum usitatissimum ; Kittan ; Flax ; Linaceæ.

II : By seed ; which must be good and clean, large, plump, heavy, bright, fresh with a thin shell. The seed is broadcasted at the rate of 5—6 kelas per fdn. Sow thickly when the object is to get good fibre ; sow thin when good seed is intended for.

III : From last half of October to last half of November ; generally earlier in Upper Egpt.

V : After 4 1/2—5 months ; in March, before the seed is quite ripe and while the outer bark of the plant is in a state of fusibility. When the lower part of stalk becomes yellow, bottom leaves begin to fall and last blossoms have disappeared. Pull by hand either at night or in early morning — Make loose sheaves and allow the plants to dry. Leave until about July, then separate the seed by beating the sheaves on a large stone. Steep or ret in water.

VII : In Egypt Flax is grown for both fibre and seed ; from the latter Linseed oil (Zeyt Har) is extracted, largely used for culinary purposes as well as for burning. The oil is chiefly used by the poor classes of natives either alone or mixed with other oils.

Linseed contains from 38—40 % of oil ; native mills get only 60—75 rtls. per ardeb of seed.

Linseed from Lr. Egt. contains more oil. Expressed in cold it has a golden yellow colour ; obtained at a higher temper. it is yellowish brown. It is the best drying oil, largely used in the manufacture of oil for paint, etc. Oil-cake is extensively fed to stock particularly for fattening and milk.

The bleached fibre constitutes the well known Linen, the broken short fibre being used for stuffing and paper-making. Under the microscope the fibre has the appearance of a cylindrical tube, not continuous but broken up by septa at irregular distances.

The linseed externally is used for poultices. Owing to its muc-

lage it possesses emollient properties — In veterinary medicine the oil is used as a purgative.

VIII : Requires a rich fertile land in good tilth and clean condition. Very exhaustive. Better a deep loamy soil, liberally manured. Koufri manure is chiefly used when the plant is about 1/2 ft. high. Thorough cultivation but not great want for water. Careful weeding especially from a wild Mustard (arb: Irilla). The steeping requires 12—20 days, average 15. Great attention is required during the process. Take plants out when the bark peels easily along the stalk.

Let the plants dry and then proceed to the «Breaking» process ; natives use a kind of wooden mallet. The woody matter of the flax stems being thus broken up, do the «Scutching» or separating the woody matter from the fibrous portion. This is generally done by means of a wooden-comb. Yield is on an average about 3 1/2 ardebs of seed for good land and about 700 rils. of first, second and third quality fibre : roughly speaking 4 parts of the first, 2 of the second and 1 of the third quality.

Lawsonia alba ; Henna (the plant), Tamr-Henna (the flower) ;

Henna plant or Egyptian privet ; Lythraceae.

II : Generally by cuttings ; Wood one year old, sets about 25 cm. long, 2/3 buried, planted alternately at a distance apart of 30 cm. on the flat. About 4 kerats of cuttings plant one feddan. Cuttings ought to be strong and provided with good eyes.

III : March and April (15—15).

V : The plant is a perennial shrub. Harvesting begins late in September or early in October. The shoots are carefully cut down, left to dry in the shade and then stripped of their leaves. Only one crop obtained during the first year. In subsequent years two crops, the first in September or early in October and the second toward the end of November. The plant lasts up to 50 years. A paying crop.

VII : The plant is ornamental in gardens, grown for its strong-smelling flowers, which are very plentiful in summer. As a farm crop it is grown for its leaves ; the shoots are largely used in basket-making.

The leaves contain a colouring substance. A decoction of them is

occasionally used in dyeing cloth. However, much the most important use of Henna in Egypt, as it has been all over the East for centuries, is as an article of toilet. From the ground leaves a paste is compounded with which the hands, nails, feet and hair, are coloured. There is an astringent quality in the drug which gently restrains perspiration, producing an agreeable coolness and general relief.

Henna is considered to promote the healthy growth of the hair giving at the same time suppleness. Externally it is largely used as an astringent, cooling, for curing rheumatism etc.

VIII : Henna requires a light soil ; a deep, moist loamy or sandy loam, provided it is rich in humus and thoroughly cultivated, best suiting it. The soil ought to be kept clean and well stirred, during the whole growth of the crop ; it requires frequent waterings except when in a dormant state and liberal manuring, both Sebach Coufri and Baladi being used either separately or mixed together.

Lens esculenta ; Ads ; Lentil ; Leguminosae ; Papilionaceae

II : By seed which is broadcasted at the rate of about 4 kelas per feddan.

III : From end of October to about the end of November ; in the Basins the date of sowing depending on the River while in Lower Egypt, it generally takes place from the first to the 15th of November.

V : Harvesting takes place earlier in the Saïd than in the Delta, about 5—5 1/2 months after sowing. The plants are pulled by hand. The produce is on an average about 4 ardebs and 3 Hemlas of Tibn.

VII : Lentil is a weak, straggling annual, delicate and rarely exceeding 2 ft. in height. It is grown for its seed which is very largely consumed in the country both in a husked and unhusked state. Pot-tage is the favourite mode of cooking the vegetable, constituting one of the chief diets, particularly among the working classes of natives. Although somewhat heating, it is highly nutritious especially when husked, containing about 25 % of albuminoids and 58 % of starch. The crop is principally consumed locally, chiefly in a husked condition. The process of husking involves much labour and shortly consists in moistening the seed, and when dry, bringing it under a rude hand-mill made of stone. The husks or shells are then separated from the

grain by winnowing, the mixture which consists of the broken seeds and husks, being further separated by winnowing and sieving. The broken seed, mixed with some of the husks, constitutes the well known «Lentil-shells» (Simm-el-Ads), largely used for feeding stock. One ardeb of unhusked seed is reduced to about 11 kelas of husked.

The Tibn is very delicate and highly esteemed. It is very nutritious and considered the best of all Tibns.

VIII: Lentils require little care in cultivation — they may be grown on almost all soils but they do best on loamy and sandy loams, particularly when rich in lime and not moist. No manure is required and a small amount of water.

Lycopersicum esculentum ; Betinghan outa or Tamatem ;

Tomato ; Solanaceae.

I : More than one var. is grown in Egypt, only one, viz : the «Skenderani» being of an economic importance. This is a large red form, more or less flat and angular or cornered, the lobes being most conspicuous on the sides.

II : By seed ; broadcasted on a carefully prepared seed-bed. The seed requires attention, as it refuses to grow when deeply buried.

III : Two main crops are obtained viz : The Winter and the Spring. In the former case the seed is sown in May and in the latter in October.

IV : About 40—60 days after sowing ; beginning of July for the winter crop and beginning of December for that of Spring. If the seedlings are over-grown, transplant them in another bed until required.— They ought to be young as then they root better.

Plant on trenches (used for watering the crop) at first close together, about 20 cm. far, then when the plants are well established thin so as to leave a space of 40 cm. between the remaining, the distance between the trenches being 4 feet.

V : Usually begins about 5 months after transpl. and generally lasts for 1—1 1/2 months. April and May are the harvesting months for the spring crop and December and January for that in winter. The plant is often killed by excessive cold and frost in December and January ; when the frost threatens, the largest green fruits may be

picked and allowed to ripen in a dry closed place. If the fruits have not reached their full size, the whole plant may be pulled with the fruits on and hung in a dry place.

VII: This is a much esteemed esculent, either raw or cooked. It possesses refreshing, appetising and corrective properties. Externally it is often used as a cooling poultice. The half-ripe fruit is often pickled. The dead-ripe fruits are crushed and the concentrated juice, after the removal of the seed and skins, is salted and canned for later use. The fruit is cooked in a great variety of ways — excellent ingredient for salads. etc.

VIII: The young seedlings planted in December require protection from North winds, cold and frost.

In Egypt, the vines are not trained but let to trail on the ground. A loose, deep, moist loam with available fertility is wanted; manuring is the main point in growing the crop. Both Coufri and Baladi are used, the latter being preferred. Heavy manuring is required for a good crop; however, if too-much is used, it makes the plants run much to vine and delays fruiting. Apply half of your manure when the plants are about 25 cm. high and the remaining half when the fruits are about the size of a walnut.

Frequent and regular waterings are necessary. Lessen the application of water when the plant is in flower.

Frequent stirring of surface soil and careful weeding. For seed choose some of the biggest fruits, earliest ripened specimens, of perfect shape with no core, crack or rot about them and evenly ripened.

The crop is of the most paying. Average produce per fedn. about 100 cantars.

**Malva parviflora; Khoubbeza; The small-flowred
mallow; Malvaceae.**

II: By seed, sown broadcast in beds. The plant being of a spreading nature it ought to be either sown thin or better in rows about 1 ft. apart.

III: During September and October.

V: Harvesting begins about 1 month after sowing.

VI: If the plant is liberally manured with f. y. manure and regularly watered, up to 4 cuttings may be taken, once every about 25 days. Generally only 3 crops are obtained the plant being then left for seed.

VII: Cooked as a pot-herb by poor natives, particularly during time of scarcity. It bears a great resemblance to Purslane and Spinach in taste. It is highly mucilaginous and has demulcent and emollient properties, particularly employed in cases of irritation of the pulmonary and of the urinary organs. Externally it is used as an emollient cataplasm to allay inflammation.

VIII: The plant often grows as weed on cultivated land. A loamy soil suits it best — Plenty of moisture is indispensable and much manure to obtain a large stock of succulent leaves. Of the easiest propagation and culture.

**Medicago sativa; Bersim Higazi; Lucerne or Alfalfa;
Leguminosae; Papilionaceae.**

II: By seed; in drills 30—35 cm. apart. One and half kela per feddan.

III: From March 15th to the 15th of May; the most favourable time, however, is about the middle of April.

V: It is generally grown for a period of 3 years. The crop will yield from April to December a cutting every 30—40 days and from December to the end of March little more than one cutting is obtained.

VI: The total number of cuttings obtained during the year is about 8, but if seed is to be taken, this is reduced to an average of 7 cuttings weighing about 45 tons altogether.

VII: Excellent for horses and milking cattle. Compared to ordinary Bersim (*Trifolium Alexandrinum*) it possesses greater feeding value being poorer in water and richer in albuminoids. However it is richer in fibre than Bersim on account of which Lucerne ought to be cut before it gets too old. Is not made into hay.

VIII: Not much grown. A perennial possessing a very long tap root. Very exhaustive. Being a deep rooted plant, the great essential for its successful growth is a good, deep and porous subsoil. The surface soil is of slight importance. A rich sandy loam suits it best. The soil should be prepared in the most thorough manner—

finely pulverised and deeply ploughed. Secure a fine seed-bed. Heavy dressings of f. y. manure, before active growth commences. The ground must be kept well cleaned of weeds, loose and friable. Liberal and frequent waterings. From middle of October to middle of February only little water is necessary. Obtain seed only once a year as the process greatly weakens the plant. Average about 1 1/2 ardebs per fedn. weighing about 335 rtls. per Ard.

Petroselinum sativum ; Bagdounes ; Parsley ; Umbelliferae.

I : (a) Baladi or Plain-leaved ; (b) Afranghi or Curled-leaved.

Baladi is the most common. The Afranghi is more substantial and ornamental but comparatively coarser and thick-leaved.

II : By seed which is sown broadcast in a fine seed-bed. The seed should be fresh ; it germinates slowly, and the plants are feeble at first.

III : From beginning of October to end of January. Better in January. Seed sown late produces plants which will last for about one year if properly looked after. Plants grown from early sowings easily push for seed and become thus useless.

V : Harvesting begins about 50—60 days after sowing.

VI : Subsequent cuttings are obtained once every about 20 days.

VII : Cultivated for the sake of its leaves, largely used for flavouring and garnishing dishes. The foliage is nutritious and at the same time stimulating. From the fruit a medicinal substance known as «Apiol» is obtained and used as an antiperiodic and against dysmenorrhœa. The oily seeds are a deadly poison to many birds such as Partridge.

VIII : Parsley is a hardy herb and it will grow almost anywhere and anyhow ; but to make a handsome crop a deep rich moist soil is required. When the plant has stood sometime it becomes coarse, but the young growth may be renewed by cutting over and liberally watering.

Phaseolus ; Phassoulia or Loubia Afranghi ; French or Haricot Bean ; Leguminosae ; Papilionaceae.

I : The genus Phaseolus is represented in Egypt by the following chief var : viz :

a) Loubia Khadra (Haricot vert); b) Loubia Hamra (Haricot rouge); c) Loubia Beurre (Haricot Beurre or Mangetout Beurre); d) Loubia Americani; e) Casheringhi or Loubia Soudani.

The first 3 belong to the species «Vulgaris» or «Common french Bean»; the fourth belongs to the species «lunatus» or a form of the well-known «Lima Bean». The last is a P. Mungo, known as the «green gram».

(a) Is the most common form; it is a dwarf prolific var. with pods green, fleshy and succulent, about 5—6 inches long and 1/2 inch broad. Seeds white when ripe and kidney-shaped — a «string bean»; seed and pods eaten when about 1/2 grown. Excellent var. and of great demand.

(b) Less common — pods subcompressed, yellow or greenish yellow smeared with red. Seeds comparatively large and kidney-shaped, light-rose marbled with red. Dwarf var. used as a «shell bean», only the soft seeds being eaten just before they begin to harden.

The Butter bean (c) is not extensively grown, though of great demand. Pods are comparatively small but fleshy and tender. Of a golden yellow or butter-yellow colour outside; the seeds are kidney-shaped. The narrow-compressed pods are cooked whole when nearly 1/2 grown. The plant is of a climbing nature.

(d) Not extensively grown — comes late in season — a strong climber — heavy cropper — good for summer — pods scimitar-shaped, fleshy, comparatively small and very broad, with 3—4 very broad and large flat seeds. Pod about 3 inches long; generally used as a «shell bean», except when the pod is very young.

(e) Only grown, both for its legume and as a fodder, in the region of Cataracts. It is sub-erect, with stem more or less hairy. Pod comparatively small and many seeded; Generally a «Shell bean».

II: By seed; sown in ridges either on one or on both sides. The var. (a) and (b) may be planted on the two sides of the ridge and (c) and (b) only on one side. Distance between the ridges 2—3 feet and that between the plants 1—1 1/2 ft. according to the var grown; 4—5 seeds are placed in each hole; later on the seedlings thinned to two. Both (c) and (d) var. require strong sticks on which to train.

III: First sowings commence as early as January the 15th but it is not safe to sow until about the 15th of February. Even this time is

considered early and sowing the main crop generally commences in March and finishes about the end of September.

However each var. seems to possess a favourite period of sowing and a var. such as the *Americani* thrives much better when sown early in April than at any other time.

V : Harvesting varies with the different kinds from 40—80 days. The var. (a) is the earliest of all, (b) is a little later, (c) requires about 2 months and (d) nearly 2 1/2 months. The time that the plants continue in producing fruit depends on many circumstances : time of planting, variety grown, etc. and varies considerably. As the green pods are gathered others will continue to be formed in abundance : but if old seed-forming pods are allowed to remain, the formation of young ones will be greatly checked. Therefore beans should be gathered when of a proper size ; this is the only way to ensure a long-continued supply of good quality both as to colour and tenderness.

VII : The vegetable is cooked in a variety of ways. Young pods are often pickled. A wholesome and nutritious vegetable. The dried seed is considered useful in cases of flatulence ; also as carminative. The whole plant is a valuable fodder.

VIII : All kinds are very tender to excessive cold and frost and require a warm sunny exposure. In selecting a var. for growth, earliness of production is of the highest importance. Abundance of production next claims consideration.

The soil should be rich and in excellent tilth. Should be grown in a rich light loamy soil and sheltered situation. Although beans are nitrogen-gathering plants, it is nevertheless advisable to apply a dressing of well-rotten animal dung, particularly in the case of «*Americani*».

Plenty of water is necessary and sticks for the climbing sorts.

Portulaca Oleracea ; Rigla ; Purslane ; Portulacaceae.

I : A common trailing weed in light ground, but also cultivated in improved strains as a pot herb, bearing a great resemblance to Spinach and Mallow. In sandy and loamy soils it is one of the commonest and most persistent of weeds, particularly among cotton, but it is little known on heavy lands.

The large-leaved sort is called «Roumi»; that with small leaves, «Baladi».

II : By seed, either broadcasted or sown in drills about 1 foot apart.

III : Generally it is sown during March and April. However the period during which the seed is sown is much more wide, extending from about the beginning of February to about the end of September. Sowings made early in February are late in harvesting, requiring about 1 1/2 months to be ready for use. However when the seed is sown in Spring, particularly in April, as well as early in Summer, the plant ripens in about 25-30 days.

V : From early sowings, generally, only a single cutting is taken while from sowings late in Spring, etc., as a rule two.

VII : The plant has an acid and pleasant taste. The fleshy leaves as well as the thick succulent stems are used raw in salads and very extensively as a pot-herb particularly by the poor classes of natives. The young and tender shoots are often pickled. The plant is considered diuretic, cooling, demulcent, emollient, alterative and antiscorbutic.

VIII : Hardy and very easy to grow in any good quick soil -- Thrives better on light soils and requires an abundance of irrigation water. No great want for manure though an application is necessary in order to get a large stock of the succulent shoots and leaves.

***Panicum jumentorum* ; Hashish gouyana ; Guinea grass ; Graminae.**

II : Although in Egypt, this perennial grass seeds freely it is best propagated by divisions of old root-stocks. Before the end of the second year the plant from frequent cutting will have formed large tussocks (Arb : Kosha); these are splitted longitudinally by means of a hand-hoe or spade planted on the flat at a distance apart 2 1/2 feet on both sides.

III : The divisions must be planted in February, towards the last half, before active growth commences.

V : In about 3 months the first crop may be taken. In favourable seasons, it has been found possible to obtain 5 cuttings during the year but under ordinary conditions, 3 are generally obtained.

VII : The plant though tried experimentally with considerable

success has not come yet into general use. It is grown as a summer fodder plant and generally eaten green though excellent hay may be prepared from the crop. The plant is nutritious and suitable for all kinds of stock.

VIII: A deep, friable, rich sandy loam is found to be most suitable for the plant. Great care must be exercised to see that the soil is heavily manured as the plant makes large demands on it. It resists the effects of the severest droughts but irrigation, enables the plant to yield more cuttings a year.

Thorough cultivation is necessary ; old plantations must be reduced by chopping the large tussocks.

Papaver Somniferum: Abounnom or Khoshkhash ; Opium

Poppy ; Papaveraceae.

II : By seed which is broadcasted on flat at the rate of about 1 kadah $1/3$, per fedn. The seed being very fine ought to be mixed with earth in order to ensure equal distribution. When the plants are yet very young thin the sickly and superfluous ones ; repeat the process so as to leave a distance of about 20 cm. between those left.

II : Generally from October the 20th to about the end of November, earlier in Upper than in Lower Egt. The seed must be of good quality, a year old and free from damp.

V : The Poppy-heads are considered ready for scarification when they present a coating of a light brown colour and do not yield easily to the touch. This usually occurs about 4 $1/2$ months after sowing, in March. The work is carried on during the middle of the day and the next morning, the hardened juice which has exuded from the cuts is scooped off with a broad-bladed, blunt knife. The incisions are made horizontally, with a sharp knife, in the centre of the head. Much care and great practice are necessary to ensure their being made of exactly the right depth.— Not too-deep nor too-shallow. As a rule the operation is repeated 2 or 3 times, after which the drug is usually exhausted. The fresh drug contains about 50 % of moisture and in the process of drying, the extract loses about $1/4$ of its weight.

VII: The plant is mainly cultivated for the dried juice of the unripe capsules which constitutes the well known opium of the *materia medica*. The action of opium depends on its alkaloids, and is chiefly determined by the Morphine present in it. Ordinary medicinal doses depress the activity of the brain and cause deep sleep with contracted pupils, slow respiration, and insensibility to pain. Besides its many medicinal uses it is also eaten and smoked. Laudanum, morphine, chlorodyne, black drop, nepenthe etc, all these have opium as a basis.

The seed contains an edible bland oil free from the intoxicating properties of the opium.

The oil is not extracted in Egypt; the seed which possesses slight intoxicating properties is alone eaten.

Opium is liable to a variety of adulterations some of which are of a very gross kind; the chief are, sugar, gums, pulp of various fruits, farinaceous admixtures, poppy seed, lupines, linseed, sesame cake, burnt bricks etc. etc.

About 6 rtls. of raw opium are obtained per fedn. and 2 ardebs of seed. Stalks are used for fuel.

VII: A sandy loamy soil is considered the best for poppy. It must be well enriched with f. y. manure and kept clean by thoroughly stirring the soil and frequent weeding.

It requires careful thinning and a more or less moist soil.

Keep some of the largest heads which have not been lanced, for seed.

**Pisum sativum ; Bissilla ; The garden Pea ; Leguminosae ;
Papilionaceae**

I: (a) Faransawi ; (b) Bazalia (c) Baladi.

(a) is a small-podded marrow-fat pea, sweet, excellent in quality and of the greatest demand. (b) is a large, edible-podded and strap-shaped var. coming next to the preceding (Pois mangetout, of the French) as regards quality and demand. It is large, long and broad, often curved, the pods being eaten when young. (c) is the well-known Gray or field pea (*Pisum arvense*) which is often met with as a mixed crop with Beans. It is distinguished from the species «sativum» by having small round compres-

seed seeds, more or less angular, generally of a greenish gray colour and often marbled, the seed of the species «sativum» being round with a uniform more or less green colour. The «Baladi» is a coarse pea almost destitute of sugar and of small demand. In cooking the fresh seed turns dark.

III: Peas require a cool season and are generally sown from beginning of October to about the middle of December. The plant is grown on holes made on ridges; 3 or 4 seeds are placed in each hole at intervals of about 8—12 inches, according to the habit of the var, the distance between the ridges being from 2—2 1/2 feet. Particularly the climbing kinds ought to be supported as soon as the tendrils appear, cotton stalks answering perfectly well, for the purpose.

The seedlings are thinned to two.

V: For early use, the dwarf var. should be selected. For the main or late crop the tall or climbing sorts, which are more productive, are preferred. Pinching-in the excessive growths tends to make the tall var. somewhat earlier. Some var. ripen within 2 months from sowing while others require 3 full months to mature their first crop. The period during which the plant continues producing also varies much, generally lasting from 1—2 months according to the sort grown, as a rule dwarf var. lasting less than the tall sorts. Care is required in cutting the pods which ought not to be wrenched off with the hand.

VII: Peas whether eaten green or ripe are nutritious and wholesome. In a green state it is an excellent vegetable, highly esteemed, delicate and of the easiest to digest.

It is cooked in a variety of ways — made into salad and canned.

Not extensively consumed by natives. The straw is nutritious and may be used for cattle.

Peas must be picked before the seed-covering becomes tough and coarse. When green they are at their best when perfectly fresh, and should come to table within 5 or 6 hours from the vine.

VII: Pea is a hardy annual and of the easiest culture. A rich, deep, friable, light soil is preferable, particularly when earliness is desired. Manure is necessary, especially a calcareous one, but an over-supply of Nitrogen or the use of coarse and fresh ma-

nure will result in a rank growth of vines, with few pods and peas of inferior quality. Regular waterings are necessary.

Raphanus sativus ; Figl ; Radish ; Cruciferae.

I : (a) Baladi ; (b) Roumi or Common Radish ; (c) Nimsawi or Issoued.

Baladi is a white, acclimatised if not an indigenous stock, the root generally being coarse, often exceeding 10 inches in length. It is less pungent than the Nimsawi, with a standing smooth leafage, both the root and leaves being eaten as a relish.

(b) Is represented by a few forms the commonest being «A small turnip-shaped», and

«A half-long, spindle-shaped», one. Both are red in colour and short-rooted.

They are earlier than the preceding and more delicate.

Only the root is eaten.

(c) This is the well known, «large black spanish radish».

The skin is black and the flesh white and firm. It is more piquant and pungent than all the preceding, also the latest of all. Particularly suitable for winter use. Only root eaten.

II : By seed ; The seeds are large and quick to germinate. Better roots and a more uniform crop are secured by sowing only the large seeds. In the case of the var. Roumi the seed ought to be renewed at least every second year. To get good Baladi seed transplanting is indispensable. The seed is broadcasted.

III : Sowing may take place at any time of the year ; however the best crop is obtained from sowings made in Autumn and Winter. During the summer months the plant easily runs to seed and the root is comparatively inferior.

V : The plant grows quickly requiring from 30—60 days to ripen its root.

The Roumy ripens in about 1 month or less ; the Baladi when intended for a crop of leaves only, is ready in about 35—40 days ; when grown chiefly for the root, in about 2 months. The Nimsawi requires two full months or more to ripen its root.

VII : It is a well known salad root much appreciated for its being succulent, and of a warm pungent taste. It is a very popular

raw salad and considered stimulant, demulcent, stomachic and diuretic. Seeds contain an oil rich in Sulphur and of a most disagreeable odour. It is not extracted.

The root eaten during a meal improves appetite, and increases the digestive power.

VIII: The plant requires a quick and continuous growth, a soil of a light nature and rather cool weather. The soil must be friable, the depth of tilth being regulated by the var. grown. To ensure a quick vegetation water is necessary as radishes grown slowly are tough and pungent; on the other hand radishes grown quickly are elegant and delicate.

No need for the soil being too-rich.

Saccharum officinarum; Kassab-el soukkar; Sugar Cane;

Graminae.

I: (a) Baladi (b) Roumi, of which there are 3 sorts, viz:

The Abiad or Light-yellow; The Ahmar or Red; and the Mikhatat or Striped, with red and yellow.

The Baladi is known in Egypt from long time ago, now being out of use for sugar manufacture. It is only grown but to a very small extent. A weak-stemmed, light-yellow cane, comparatively shorter and thinner than the Roumi, less flinty outside, softer and less stringy. It is also more juicy but with a lower percentage of sugar in the juice, compared to the Roumi var.

The Roumi was introduced from Bourbon and Otaheite during the beginning of the last century. It is a strong-stemmed, grand cane, largely grown in Upr. Egt. for sugar extraction.

The «Red» form generally contains the highest percentage of sugar. It is hardy and keeps comparatively longer when harvested. It is considered the best of all forms.

The «Striped» frequently yields a greater weight of Cane whilst the Abiad often requires a longer time for maturing.

II: By sets or cuttings of the stems. The Canes selected for the purpose are generally those of second year's growth. These after being trashed are cut into suitable lengths, of about 1 mtr., in order that they lie straight and flat in the bottom of the furrows, the distance between the latter being about 75 cm. Generally speaking a



feddan of good Canes will plant six others, about 100 cantars of seed-cane being required per feddan. The lowest part of the cane, in spite of its being the richest in sugar, is of the least value for the development of the new plant. Later on when the plants are well up, the soil is thrown into ridges, the distance between their tops being about 75 cm. This takes place after about 2 months from planting.

III : The time of planting varies from about the 15th of February to the 15th of April, however March is the most favourable time. Generally the crop is planted earlier in Up. than in Lower Egypt.

V : The crop generally remains in the land two years although an extension of one year is often allowed.

Planted at the most favourable time, the cane comes to maturity 8—9 months after planting, earlier in Upper than in Lower Egt, being at its best in November.

The amount of produce varies largely depending on many circumstances. It depends not only on the quality of the land, but also on the age of the Canes; whether they are of the first, second or third year's growth. In the case of the first year's canes, it is the greatest, although the difference between it and that of the next year is not very marked in the case of rich land, but with the third year comes a great diminution in yield.

500—700 cantars of trashed canes, may be considered as a normal average yield, on rich land, for the first cutting, 500 for the second and 400 or less for the third. As regards the amount of sugar in the cane it also depends on many circumstances. It varies much according to the district, variety of cultivation and climate, age of the cane, etc. The average of a normal well cultivated crop will lie between 13—15 %, total sugar, with 14 % as an average (in case of frost being less). Of this about 2.5 are molasses or uncrystallizable sugar, the remaining 11.5 being crystallizable.

For the extraction of sugar, both the «crushing» and «diffusion» systems are practised, and though the latter is the most modern arrangement for obtaining the highest yields of sugar, the «Crushing» process is that generally used in Egypt.

VII : The uses of sugar as an aliment and condiment are numerous. It is employed for making syrups, electuaries, and lozenges, and is

regarded as useful not only for disguising the unpleasant taste of drugs, but also on account of the preserving influence it exerts over their active constituents. It is nutritious, powerful antiseptic, demulcent, etc. It is used as an adulterant in many cases and often when burned replaces «hops» in making beer. Molasses contain a high per centage of Potash and are often used for the preparation of the latter. Also they are fed to stock. Spirit, etc. are obtained by distillation. The bagasse may be made into paper; it is chiefly used as fuel. Leaves and tops when green are excellent for fodder. They may be turned into Silage. The concentrated, sugar-cane juice, known as «Assal-el-Soucear» by natives, is largely consumed, instead of Honey.

VII: For the successful growth of S. Cane, extremely heavy clays are objectionable, as well as the light sandy ones. Alluvial soils are those held in great favour and rightly so, for they generally consist of a mixture of clay and sand. They ought to be deep, porous and friable.

The presence of an excessive quantity of salt is extremely injurious, for not only is the growth and development of the cane checked but the juice is also affected. Deep drainage is necessary, thorough cultivation, liberal manuring in the form of f. y. manure and regular waterings. The soil ought to be often stirred and free of weeds.

The manure generally used is the Baladi at the rate of 15 or 20 cub. m. per feddan; half this is ploughed in before planting and the remaining half, during the final earthing up, in May.

Though sugar cane requires regular waterings up to the time of high Nile, considerable injury often results by watering the crop, generally after the beginning of September. As canes approach the time of ripening, two months of hot and dry weather are necessary to bring the juice to the highest degree of sweetness, and if much water is given, during that period, the result is continued growth at a sacrifice of sugar; besides a delay in maturity.

Solanum melongena ; Betinghan ; Eggplant ; Solanaceae.

I: (a) Roumi, Roumanli or Malti ; (b) Baladi.

Roumi, is a more or less globular violet form, with fruits often very large, much milder in character than the Baladi. The plant is comparatively less hardy and low; it is not so popular but of great

demand. Chiefly consumed by Europeans. The Baladi, of which two kinds are known, viz: The blackish violet (Issoued) and the White (Abiad).; both possess oblong fruits, the White being less popular than the Violet. The White is less hardy, the fruit smaller, but milder in character, more delicate and of greater demand.

II: The plant is propagated by seed, broadcasted in a finely-prepared and well enriched seed-bed. Seed must be of the best strain, obtained from the fruits which are allowed to ripen on the plant till they become golden yellow.

III: The seed is sown twice a year: (1) Towards the beginning of June; (2) Early in February.

VI: The seedlings are transplanted 40—60 days after sowing when 25—30 cm. high, on ridges 40—50 cm. apart and 70—85 cm., between the ridges.

V: It is a little earlier in the case of Roumi than Baladi; generally about 3 1/2—4 months after planting the seedlings (Betinghan Arous). In the case of Baladi, particularly with the Violet sort, if the plants are carefully protected from excessive cold and frost, a second crop may be obtained in May. In such a case the plants require manuring and a number of the branches must be pruned in February. An early crop is thus obtained but the fruits are comparatively smaller and more acrid (Betinghan Okr).

VII: Egg plant must be regarded as one of the most important of indigenous vegetables. It is cooked in a variety of ways, largely pickled and often eaten raw. The fruit must be eaten before it reaches its full size, as the seeds which fill the ripe fruit are indigestible. Besides a heavier crop may be secured by taking off the fruits before they reach their full size.

VIII: The plant develops to greater perfection on a rich deep loamy soil.

Plenty of Baladi manure is necessary, thorough cultivation, deep drainage and a sunny exposure.

Solanum tuberosum; Batata; Potato; Solanaceae.

I: The «mealy Potato», so much desired by the consumers is not met with in Egypt, and good potatoes, in the usual acceptance of the term, are not or but very rarely grown. The tubers found

in the market are the produce of French seed, generally known as Marseilles potato, though sometimes Italian varieties are also found the former being superior and preferred.

Generally speaking, the forms grown are more or less round (Patraque, of the French), very irregular in shape, thick in the skin, with many very deep eyes. Owing to their deep eyes there is a great waste when peeling in preparation for cooking. However they are hardy and heavy croppers.

For Egypt such var. as the well known «Magnum Bonum» is not to be recommended, a variety really good for the country, being the french : «Saucisse».

II : By tubers ; Considerable differences of opinion have existed in the minds of practical men as to which is the better practice, to plant whole potatoes or to use larger ones, cut into pieces. It is beyond doubt, however, that the use of very small ones is an extremely objectionable practice and various experiments carefully conducted have unmistakably shown that the greatest yield is obtained when medium-sized uncut seed is planted. A greater weight, however, is required when whole tubers are used, 14 or 15 cantars being required per feddan, while 12 or 13 are sufficient in the other case. Use fresh seed which should be fully matured. Cut your seed-potatoes longitudinally leaving 2 good buds or eyes for each set. The sets or whole tubers, as the case may be, are planted in holes about 30—35 cm. apart, the distance between the ridges being about 75 cm.

III : Two crops are grown, viz : the Sefi, from middle of January to about the end of February ; and the Shitwi which may be planted as early as August the 15 till about the end of October. However as the plant is very sensitive to excessive cold and particularly frost, the Shitwi crop must be planted as early as possible in order to escape frost late in December and January. The tubers are long to sprout requiring about 20 days to produce aerial shoots.

V : Harvesting of the crop takes place 3—4 months after planting the time depending on many circumstances. The Sefi crop generally ripens earlier. If the crop is intended for seed, it ought to be fully matured thus requiring more time. However, on an average about 3 1/2 months are required and the crop is not ripe until the

skin of the tuber fails to peel off when rubbed. The produce per fedn. also varies from about 3—5 tons being greater in Summer than in Winter. However, the price per ton is lower in the former than in the latter case.

VII : Potato is one of the most cultivated plants. It is of great importance as affording food both for human being and for stock ; next to the principal cereals it is the most valuable of all plants for human food. It is also used for various purposes in the arts. For human use it is variously prepared. For stock potatoes are used both raw and boiled. The tuber in a fresh state contains about 71 — 80 o/o of water and 12 — 27 o/o of starch. There are considerable differences, however, in different varieties, in different stages of maturity and in different soils and seasons.

Its starch is easily separated and is cheaper than any other kind. It is largely used in textile manufactories, and in preparing a coarse spirit known as Potato brandy, etc. etc.

VIII : Potato requires care in cultivation. A light friable sandy loam is necessary, plenty of well-rotten dung and much capillary moisture. Deep and thorough tillage, frequent surface stirring and careful weeding.

It is very tender to frost and requires great attention.

As regards manuring this is one of the main points in Potato culture. Baladi manure is used the amount varying from 10—15 cb. m. per fedn. and depending on many circumstances. Great care is required in watering the crop and the practice of applying water to the plant just before harvesting, the object being apparently to cause the tubers to swell and consequently to increase in weight, must be avoided.

Spinacea oleracea : Sabanekh : Spinach ; Chenopodiaceae

1 : (a) Roumi, Round or lettuce-leaved Spinach ; (b) Baladi or prickly-Spinach.

The former is less popular — It is of a low and spreading nature, with leaves broad more round and blunt, soft and flabby and the seed or fruit more or less round and smooth. This is the *S. Glabra* of some Botanists.

The latter is extensively grown. It is more or less erect, with lea-

ves somewhat triangular and arrow-headed, succulent and crispy and the fruit rough with prickle-like projections. It is hardier than the preceding.

II: By seed ; in the case of Roumi it is better sown in rows, on the flat, about 1 ft. apart ; in the case of Baladi the seed is broadcasted.

III: Spinach is a cool-weather plant ; it may be grown from September, at intervals, till the month of January. As the weather begins to become hotter, the activity in growth decreases and the plant is inclined to bolt.

V: The plant is ready for cut 50 — 60 days after sowing ; it is generenally cut with a portion of the root.

VII: Spinach is a favourite vegetable as well as wholesome. The plant is grown for its young leaves and succulent leaf-stalks. It must be used before the stem begins to develop, the leaves becoming bitter and almost unfit for use.

VIII: A plant of easy culture ; however for quick results and for tender, succulent foliage, land which has an abundance of available plant food and particularly of Nitrogen, is most desirable. Thus a well tilled rich loam and abundant water as well as f.y. manure, are needed to produce first class spinach. Better a shady situation.

Trifolium Alexandrinum ; Bersim Baladi ; Egyptian Clover ; Leguminosae ; Papilionaceae.

I: (a) Fahli ; (b) Saïdi, Baali or Siba ; (c) Miscawi ; (d) Khadrawi. The Fahli, is of a tall luxuriant growth, cut but once, the root dying after it is cut. It is the best for hay, for which purpose it is chiefly grown. To obtain the seed it is generally sown in conjunction with Wheat or Barley at the rate of about 3 or 4 kadahs per fedn.

The Saïdi, is of a trailing nature, requiring but little water for growth. Generally cut twice and occasionally 3 times ; chiefly grown in the Basins. Smaller in growth compared to all others and less succulent. To prevent creeping along the ground some Fahli seed is often sown with it, about $\frac{1}{3}$ of Fahli to $\frac{2}{3}$ of Saïdi.

The Miscawi, is of a tall and succulent growth requiring much water ; it is grazed or cut 4 or 5 times and is chiefly grown on land under perennial irrigation.

The Khadrawi, is less popular than the preceding varieties, tall and succulent in growth, requires much water and gives one or two cuttings more than the Miscawi.

II : By seed ; 2 — 2 1/2 kelas per fedn. ; little less in the case of Fahli. Broadcasted on the mud, and not covered in.

III : Bersim, although it is so easily grown yet on one particular circumstance the success of the crop greatly depends on the time of sowing. Early sowing is sometimes a disadvantage, for it is found that the crop often falls a victim to the Bersim worm. Late sowing, on the other hand, is often attained with bad results for growth is checked by cold weather. Besides, if the seed is sown late, harvesting of the first crop is much delayed.

Bersim is sown as early as the beginning of September and as late as the beginning of December, earlier as we go towards the North, October being the most favourable time.

V : The time and number of cuttings depend much on the time of sowing ; under ordinary circumstances and taking as an example, Miscawi Bersim, the first cutting is taken about 50 days after sowing ; the second after 50 days from the first ; the third 45 days later ; the fourth after a delay of 40 days from the third and the last in about 35 — 40 days from the fourth. After this the plant is left for seed.

VII : Bersim is chiefly eaten green by stock. Generally it is grazed in the field ; it is also made into hay and only occasionally into silage. Particularly in Lr. Egt. it is often ploughed in as a green manure. In a green state it is given to animals during about 6 months a year, from about December the 15th to the middle of June.

Under ordinary circumstances 2/3 of a fedn. may be considered sufficient for each working bylock, buffalo or cow, during the whole Bersim season ; about 1/2 a fedn. for a horse or mule ; a little more for a camel and about 1/4 of a feddan for a donkey.

Care is necessary in feeding green Bersim to stock, particularly at the beginning of the season as when too young, too succulent and moist, it often causes the well known Tympanitis (Arb : El-Intifakh) very detrimental, particularly to Cattle and Sheep. As regards hay, the Fahli and Miscawi are those chiefly made into, in the case of Miscawi the 3^d cutting being best. The Bersim for hay, must be cut

just before flowering is completed, a period during which the crop is richer in nutritive substances. The quantity of green material necessary to produce a given weight of hay varies according to the stage of ripeness, but generally speaking 4 or 5 parts of green Bersim produce 1 part of hay, by weight. It is rather difficult to state the weight of green crop produced at each cutting, since it is cut at such varying stages of growth. However, in the case of Fahli the average is about 9 — 10 tons, with Miscawi and Khadrawi about 8 and in the case of Saïdi about 7 tons. The amount of seed obtained per fedn. usually is from 1 — 1.5 ardebs weighing about 320 rtls per ardeb. About 2 Hemlas of Tibn are also obtained, chiefly used for feeding Camel, goat, etc. and in making bricks.

VIII : Bersim requires but very little care in preparing the land and in after cultivation. It grows well on almost every var. of soil even on those which contain a considerable amount of salt. Under ordinary circumstances manuring is quite unnecessary only water being indispensable with the Miscawi and Khadrawi varieties, in order to obtain a satisfactory crop.

Sesamum indicum ; Simsim ; Sesame or Gingelly ; Pedaliaceae.

I : (a) Abiad ; (b) Ahmar.

The former is a yellowish-white-seeded var. producing a pale, fine oil. Is of great demand.

The latter is darker in colour, generally light brown ; the oil is comparatively darker. It is of a less demand. The dull colour of the oil obtained from this var. is due to a colouring substance in the cells of the seed-husk. By repeatedly washing and rubbing the seed and then drying, the majority of the colouring matter is thus removed.

II : By seed ; broadcasted at the rate of 1.5 Maloua per fedn. The seed being light as well as of a small bulk, it is mixed with some amount of fine earth in order to assure a regular distribution. Plants require careful thinning, particularly when they come up too thickly.

III : It may extend from the beginning of June to the middle of July, the best time being late in June.

V : Plants are pulled by hand about 8 days before they are dead ripe. When perfectly dry the seed is shaken out on a cloth. The

operation is repeated after a few days as all the seed cannot be obtained at once.

Harvesting takes place on an average after 4.5 months, generally in October.

VII: The plant is chiefly grown for its oil-yielding seed, sesame from Lr. Egt. generally producing more and better oil. Though the seed contains from 50—57 % of oil, by native mills not more than 115 rtls., are obtained per ardeb. The oil is very extensively used in Egt., probably to a greater extent than any other, by the rich of the country. It is known as «Zeyt Sirig» and usually possesses a yellow colour. It is clear, limpid and free from odour. It has a bland agreeable taste so much so that the cold-drawn oil is considered equal, if not superior, to olive oil. The better qualities of it, may be used for all the purposes to which olive oil is put, only the lowest qualities being used for soap-making, burning, lubricating, etc. The oil is often adulterated with cotton-seed oil. The sesame seed is roasted before it is pressed for oil. The cake is too dear to be used for stock and is generally eaten by poor, under the name of «Kozba». Some other secondary products are also obtained during the process of pressing for oil, such as the «Tahina» etc. The seed is largely used in many domestic purposes, confectionery, etc. Stalks are used for fuel.

VIII: The crop requires a fine seed bed, a deep and rich sandy loam, plenty of moisture and for a good crop, liberal manuring in the form of Sebach Baladi. The plant requires frequent stirring as well as careful thinning. Water is necessary for a good crop and irrigation ought to be suspended for about 20—25 days, before harvesting. As a rule no water is required till about 5 weeks after sowing.

Oryza sativa; Rouz; Rice; Gramineae.

I: A few varieties are only common the chief being: Fino. Aen-el-Bint, Yamani and Sabe'ini. Each of these possesses peculiar structural characters. They particularly differ in the period they occupy the ground. As regards quality and market demand, the Fino occupies the first place, next comes the Aen-el-Bint; the Yamani follows the Aen-el-Bint and lastly comes the Sabe'ini.

The Aean-el-Bint and the Fino, occupy the soil for about 5 1/2—6 months, the unhusked or cleaned seed being white in colour.

The Yamani occupies the land for a period of 3 1/2—4 months, the seed being white; the Sabeïni only for about 2 1/2—3 months, the seed being dirty white in colour. This var. is chiefly grown to assist the reclamation of salt land, being hardy and occupying the ground for a short time, as well as requiring much water for its growth, which in a great measure completes the sweetening of the land.

II: By seed (husked or Paddy, Arb: Rouz Shaery); The seed is made to sprout before it is sown. The seed corn is steeped in water for 4—6 days—drained and spread on a wooden floor for 1 or 2 days until it sprouts.

The seed-layer is covered with Bersim or any other green stuff, and often weighted, to accelerate germination. The whole process of steeping and sprouting takes generally 7--8 days.

The amount of Paddy required per feddan varies from 3—3 1/2 kelas, more seed being required in the case of Sabeïni than with the other var. the Sabeïni, tillering less than the other sorts. The seed is broadcasted on a well-levelled ground under water. The water is not changed until the seedlings have rooted well.

III: The time of sowing the crop depends on the var. to be grown. In the case of Fino and Aean-el-Bint the crop is generally sown in May, the Yamani early in May and the Sabeïni during the month of August.

V: The time that the crop occupies the land, depends on the var. grown and generally is from 3—6 months, October being the usual month of harvesting.

The produce per feddan of average good land is about 6 ardebs of Paddy or Rouz Shaery, the Ardeb being 30 kelas. Roughly speaking 2 parts of Paddy when husked are reduced to about one part of Clean Rice (Rouz abiad), the ardeb of the latter being equal to 14 kelas and weighing about 156 okes. The cleaning process is somewhat complicated and mainly consists in repeatedly pounding the grain in a huge wooden mortar with a wooden pestle shod with iron. The blanching process is completed by adding salt or gypsum, either alone or mixed, salt being preferred. The husking process employs a large amount of labour and involves a cost of about 45—50 P. T. per addeb.

The amount of straw obtained per feddan is about 1 ton, chiefly used as a bedding for horses and paper-making. Not fed to stock.

Threshing the corn is somewhat long. It is better done when the straw is moist.

VII: That the grain of rice is one of the chief articles of human food, need scarcely be stated here. The chaff or husks and the waste broken fragments obtained in husking and winnowing constitute also important articles of cattle food; the husks are also employed as fuel. Rice is a wholesome and nutritious food, though when taken alone, is less nutritious than other grain-food. It contains about 13 % of moisture 7 % of albuminoids and about 78 % of starch. Ground rice is in great demand for puddings; being poor in albuminoids, it is capable by itself only of an imperfect fermentation, and is unfit for being baked into bread. A beer is made from the grain as well as spirit. The starch is extracted in considerable quantity and is used in laundries and muslin manufactories. In medicine rice is considered a light article of diet suited to invalids and dyspeptics. Externally it is used as a poultice as an application to burns and scalds. The dry powder possesses cooling properties and is much used as a cosmetic. Rice water is recommended as an excellent demulcent, refrigerant drink, etc. etc. also as checking diarrhœa.

VIII: Rice appears to be grown on almost every description of soil indifferently, when there is a constant supply of water. However for a successful growth the best soil for it is a sandy loam. It must be deep, well-tilled and on a perfect level.

Rice is grown both in Lr. and Upper Egt. for its grain and as a reclaiming crop on somewhat salt land. It is not so hardy and only thrives on those alkaline soils containing a comparatively small amount of salt provided the crop is always under water and the soil deeply and thoroughly drained. In upper Egt. only Fayoum grows rice and in Lr. the Northern parts of Behera, Sharkieh, Dakahlieh and Garbieh, provinces, the rice from Upper Egt. being comparatively inferior in quality.

The crop does not require much care in preparing the soil and manuring but needs careful weeding, particularly from the Dineba grass which is found to grow plentifully with Rice. Repeated thinings are also necessary, where the plants are too-thick.

Sorghum Halepense ; Hashish-el-Garawa ; Johnson or Cuba grass ; Gramineae.

II : The plant is propagated by seed, planted in holes 50 cm. apart. Also by divisions of old root-stocks. Planted on the flat.

III : The seed is sown in March ; in the case of propagating the plant by means of divisions of old root-stocks, this may be carried on from about the middle of February before active growth commences.

V : Under a good system of cultivation, etc. the first cutting may be taken about 2 1/2 months after sowing and 4 cuttings may be taken until the end of October. During the winter months, the growth is checked and the plant remains in a somewhat dormant state until the next spring, when it recovers.

VII : This perennial grass is grown as a green fodder plant. It is a tall herb, with numerous suckers, producing under a good system of cultivation, chiefly liberal manuring and watering, a large amount of green herbage for summer use.

It produces an excellent fodder and particularly when young it is very tender, sweet and greedily eaten by all kinds of stock.

VIII : The plant is very prolific and hardy. Rich well-drained calcareous soils and especially rich alluvial ones will grow this grass luxuriantly. It resists the severest droughts, etc, but for an abundance of green herbage, liberal manuring in the form of Sebach baladi, and plenty of waterings, are required.

The crop must be often renewed as in old plantations, the roots become thoroughly matted in the soil and the yield decreases

Sorghum saccharatum ; Sorgho or Negro ; Sugar Sorghum or Broom Corn ; Gramineae.

II : By seed which is better dropped in behind the plough, each alternate furrow being only sown, at the rate of about 1 1/2 kelas per feddan. Also broadcasted and harrowed in.

III : Sowing may begin from about the end of March and may last until the beginning of August.

The plant is a quick growing one and the first cutting is generally taken 60 days after sowing. As a rule only a crop is obtained, howe-

ver a second, though not so abundant as the first, may be taken on good loamy soils. The life of the plant is from 3—3 1/2 months.

VII: Certain forms of this plant are grown for fodder, others for grain; but the chief point of interest in the plant is the development of sugar in its stem. Notwithstanding this, of all the uses to which this plant may be put, that of growing it as a forage crop will probably be found the most important.

In Egypt this annual grass is grown for two chief purposes, viz: (a) as a summer forage crop, particularly in the sea-coast regions, on somewhat salt land; (b) with the object of keeping the salt-table in check, the water applied to the crop, preventing salt efflorescences from reaching the surface of the soil.

Particularly when young it is tender, sweet and much relished by stock, both leaves and stem being chopped and given to them. The seed is not made into bread and sugar is not extracted from the stalk.

VIII: The plant resists much to salt and will thrive to some extent on the poorest soil, careful ploughing and manuring not being necessary. However, it will thrive better on rich alluvial soils, provided they receive a regular and abundant supply of water.

Triticum ; Kamh or Hanta ; Wheat ; Gramineae.

I: The most important species of «Triticum» grown in Egypt, are three, viz:

- (a) *Triticum vulgare* ; or Common wheat.
- (b) *Triticum durum* ; hard or flint Wheat, and
- (c) *Triticum turgidum* ; Turgid or Rivett wheat.

Of the above three the species «Durum» is the most important, constituting the greater bulk of the Egyptian Wheats.

For agacultural and market purposes, Eg. wheats are ordinarily grouped, according to the colour of grain, into «Red» and «White» of which there are Red and White, Saïdi and Beheri Wheats. The «White» has a grain usually of a yellow-straw colour although often with a shade of brown in it; the fracture is white and floury, the inner portion of the grain being friable. The grain is generally more plump and softer compared to the Red, as well as the more valuable form as it yields the finest flour.

The Red is comparatively duller in colour, generally more flinty,

thinner with a fracture which instead of being farinaceous, is smooth and glass-like.

Only a very small number of the market samples, however, present these characteristics with distinctness, the greater bulk of them consisting of mixtures of both forms in all possible proportions. Thus it is almost impossible to find a pure sample of either a red or a white wheat.

Generally speaking, Egt. wheats are, comparatively, poor and with the exception of but a very few varieties, there is a great want in the increase of Albuminoids, the percentage generally being between $8\frac{1}{2}$ — $10\frac{1}{2}$. As regards the amount of moisture in them, it is very low (between 5.25—7.50), and Egyptian wheats are in special request on account of their dryness, which renders them useful for admixture with those wheats containing too much water and obtained in countries possessing a variable climate at the time of ripening, particularly when harvested in wet seasons.

Comparing Saïdi and Beheri wheats, the former are regarded superior, being richer in proteid substances and of higher market demand.

Red wheats are richer in albuminoids, compared to White; the amount of starch in them is nearly equal, in both cases. Though red wheat is richer in nitrogenous substances, the white commands the higher price because it yields flour producing a white bread.

The average weight per ardeb of Egt. wheats, is about 320 rtls. and the amount of loss per ardeb, in the form of bran, pollards, etc. between 2.5—3 kelas.

Many sorts of wheat are distinguished by natives, one of the best being the «Bouhi» white.

A soft, white wheat (Hindi or Indian) was lastly introduced from India (Dehli district of the Punjab) which gave satisfactory results, both as regards quality and yield. It weighs more per ardeb, and realizes a higher price, compared to native wheat.

II: By seed; broadcasted, generally at the rate of 6 kelas per feddan.

III: Late in October to end of November; Upper Egt. sowing depends on the fall of the river; Lower Egt. generally from 15—30th of November.

V : Wheat is harvested about a fortnight later than Barley, occupying the ground for 6—6 1/2 months, the crop ripening about 1/2 month earlier in the Saïd than in the Delta.

The crop is harvested and thrashed like Barley.— It takes longer to thrash and winnow compared to the latter. Never pulled by hands.

The yield of Wheat is considerably less than of Barley, 5—6 ardebs, being the average on good land. Wheat tillers less than Barley, though it produces more tibun which is comparatively superior in quality. The average on good land is about 6 Hemlas.

VII : The uses of Wheat are too well known to be mentioned here. It is the most esteemed of all cereals particularly for the making of bread. It varies much in composition and its value depends mainly on the quantity of fine flour which it yields and which sometimes is as low as 54 % and as high as 86. In general the smoother and thinner the grain is in skin the greater is the produce of fine flour. The aver. amount of starch in Eg. wheats is about 77 %. Bran etc. are chiefly used for feeding horses and to a less an extent given to milking cattle and as a food, in the form of mash, etc. to sick animals. It is given to poultry and pigs and externally is used in medicine as an emollient poultice. The straw is largely fed to stock, during the dry season, from about 15th of June to December.

VIII : Wheat is less hardy to salt than Barley. It requires a deep soil and only thrives on soils of a clayey nature. It does not want much care in preparing the soil and but little care in after-cultivation. No much water is necessary and in the basins it is raised without any application at all. As regards manuring both Coufri and Baladi are used, the former generally when the plant is about 1 ft. high and the latter before sowing. In Lr. Egt. where the crop in the majority of cases, follows Maize, wheat receives a great share of its fertilizer through the Maize crop, the latter being purposely supplied with a heavy dressing of manure.

Vigna Sinensis var. sesquipedalis ; Loubia Baladi ; The Chinese or Black-eyed Bean ; Leguminosae ; Papilionaceae.

I : This plant bears a great resemblance to the well-known « Cow-pea » (V. Catjang) ; It is an annual tall and twining plant with

Pods pendulous, subcompressed, often very long and many-seeded. The seeds are kidney-shaped, small and usually white with a shade of yellow, darker about the hilum. It is very largely grown both for the young pods and for its grain.

II : By seed ; grown in holes on ridges. Three to four seeds to each hole at a distance apart of 35-40 cm. and 2 feet between the ridges ; thinned to two.

III : The plant may be sown as early as the beginning of February but the main crop is generally sown early in March.

V : Harvesting begins about 50-60 days after sowing and the plant will continue producing through the whole summer until about the beginning of October. As the green pods are gathered, others will continue to be formed in abundance ; but if old seed-forming pods are allowed to remain, the formation of young ones will be greatly checked.

VII : The plant is grown for its green pods and seed. Pods are cooked in various ways, and often pickled. The dry seed which is very nutritious makes excellent soup. It contains about 24 % of albuminoids and 56 % of starch. The green plant is an excellent fodder for stock but the straw coarse and of a little value. The plant is very often grown as a catch crop with Sugar-Cane, Colocassia, etc. in March and April.

VIII : The plant is hardy and prolific. Often it is exclusively grown for grain, requiring about 5 months to ripen its seed. The plant though of a twining habit is not trained on sticks, etc. It requires a rich light loamy soil and copious waterings if the object is a continuous supply of green pods. In the latter case manure, in the form of well-rotten dung, is also necessary.

**Trigonella Fœnum graecum ; Helba ; Fenugreek ;
Leguminosae ; Papilionaceae.**

II : By seed ; which is broadcasted on the mud after a heavy watering, at the rate of about 4 kelas per fedn ; more seed being required when the crop is intended to be cut green than when grown for grain.

II : From October the 15th to about the end of November, generally later when grown for grain.

V: For the green crop about 2 months after sowing and from 4 1/2—5 months when grown for seed. On an average 4 ardebs of seed are obtained per feddan and about 3 Hemlas of a coarse kind of straw or Tibn. The green crop is cut once.

VII: The plant is grown for 3 different purposes, viz: As a fodder in a green state; for human consumption in a green state and for grain. As a fodder it is chiefly fed to camel and cattle, rarely alone as the plant possessing laxative properties, often causes diarrhœa to stock. The plant is generally given in conjunction with Bersim.

For human consumption the plant is largely eaten raw as a relish and the seed is mixed with Maize and Millet grain to render bread more palatable; (6: 96)

Both the green plant and seed are accompanied by considerable bitterness. The latter has an unpleasant odour, with an unctuous, farinaceous taste. The seed is occasionally given to stock as a condimental, stimulant and tonic food.

The seeds are supposed to be carminative, tonic and aphrodisiac. They are often recommended for use in dyspepsia with loss of appetite, also in dysentery, colics and as anthelmintic. Both the green plant and seed are described as aperient, diuretic, emmenagogue, depuratory, hot and suppurative. The seed is also considered astringent and recommended as a lactagogue. The germinated seed is largely eaten, on an empty stomach early in the morning, as a tonic and aperient. The straw is coarse, chiefly used for camels, goats and in making bricks.

VIII: Largely grown either alone or as a mixed crop, particularly with Barley.

The plant is of an easy cultivation. No much care in selecting the soil, the plant growing best on good alluvial soils and clayey loams. No need for manure and but little water wanted. No much care in after cultivation.

Vicia faba ; Foul ; Bean ; Leguminosae : Papilionaceae.

1: (a) Roumi ; Broad bean ; (b) Baladi ; Horse or Tick bean.

The former is mostly grown in gardens and chiefly eaten green. The latter is a field crop and chiefly fed to stock. However it is

also largely used for human consumption, constituting one of the most important staple foods among natives.

The Roumi is of a comparatively larger growth and comes later to maturity.

The pod as well as the seed are flat and large. The seed is either white or red-skinned.

In the case of Baladi the pods are short and the seed small, both being subcompressed. The seed is either white or red.

There are no distinct var. of either Broad or Tick beans; the white-skinned forms being considered superior for cooking.

Bean is grown both in Upper and Ir. Egypt, the Saïdi crop being preferred as it cooks quicker.

II: By seed; The Roumi is planted in holes on the flat. Three to 4 seeds are placed in each hole at a distance apart of 30—35 cm. The plants are then thinned, 2 being only left. The Baladi is always sown broadcast at the rate of 6—8 kelas, less seed being required on land under perennial irrigation; generally 6 k.

The seed must be of superior quality and particularly free from any Broomrape seed (Halouk) often found mixed with it.

III: The plant is sown as early as the beginning of September, particularly the Broad bean, being sown earlier than the Tick. But the main crop is generally sown late in October to the end of November, early sowing being preferable, in order that the seed hardens before the «Khamsin winds» begin to blow, which are very detrimental to the crop.

V: Harvesting depends on the purpose for which the crop is grown; also on the time of sowing. Under ordinary circumstances the crop requires about 4 1/2—5 months to ripen and when intended for culinary purposes, in a green state only 4 months or less are required. The crop is cut by means of a small hook before it becomes too ripe.

When completely dry it is thrashed by means of the Norag, the operation involving less labour than for Wheat and Barley.

The produce per fedn. greatly varies; however on an average good land, 5 or 6 ardebs of seed and 4 or 5 Hemlas of Tibn, are considered common. The weight per ardeb is about 325 rils.

VII: Beans are used both for human consumption and as a food for stock, in the latter case the Tick bean being only used. It is

rich in nutritive substances containing about 25 % of albuminoids.

Beans are chiefly used in feeding working bullocks : they are admirably suited to them and keep them in good condition. They are also used for fattening stock, milking cattle, donkeys and to a less an extent for camels and hard working mules. The seed is besides largely used for culinary purposes, especially in a dry state.

Cattle are fed on beans during the whole dry season, extending from about the 15th of December till about the middle of June ; the seed is given in a crushed condition generally in conjunction with Wheat or Barley straw. The amount given to cattle particularly to working bullocks, generally varies from 1/6 to 1/3 of a kela daily depending on the work to be done, when at rest receiving less beans than when working. As a food for milk, perhaps no other food substance than bean, is more universally used when milk of superior quality is the object.

The straw is coarse and is particularly fed to camel, goat, sheep, etc ; often it is used as fuel, litter and in making bricks.

VIII : Bean only thrives in a soil of a heavy nature. It does not succeed on light soils and requires no manure at all for its successful growth. No much care is wanted in preparing the land and but a small amount of water is required. In the case of Broad bean, the plants should be topped when the pods have set, to promote filling of the pods. Broomrape is often very detrimental to the crop particularly on somewhat light soils.

**Zea Mays ; Doura shami ; Maize or Indian Corn ;
Gramineae.**

I : Many varieties are grown, the most important being :

(a) Baladi or Hamami ; (b) Sinebra ; (c) Morali ; (d) Biltani ; (e) Nab-el-Gamal.

(a) of which two forms are known, viz : the Sittini or Manialawi and the Sabeini, ripening respectively in 65 and 75 days, is the earliest of all var. at the same time being the least exhaustive. The plant is comparatively low, the ear and grain small. A light cropper, it is sweet when fresh and particularly grown in the neighbourhood of large towns, for human consumption, in a green or fresh state (toasted). Also largely grown for grain.

(b), (c) and (d) bear great resemblance as regards their habits, etc. and are especially grown for grain. The plants are comparatively high, the ear and seed larger than the preceding. They yield a heavy crop and are more exhaustive than Baladi. They ripen in 90—100 days.

The Nab-el-Gamal is the tallest, latest and most exhaustive of all var. grown. A heavy cropper, it is of a strong growth and only thrives when very heavily manured. The ear is large, the grain large and flat. The plant requires more space for successful growth and ripens in 110—120 days.

There is but a slight difference concerning the flour-yielding power of the above varieties; as regards their suitability to bread-making, there is a great diversity of opinion, the Biltani and Baladi, being considered the best.

II: By seed; generally dropped in behind the plough, each second furrow being sown. When the plant is grown for fodder the seed is generally broadcasted, no thinning being necessary. The amount of seed required per feddn, varies from $2\frac{1}{2}$ —3 kelas, the crop intended for forage, in a green state (Darawa or Garawa) being sown rather thickly. The seed is steeped in water for 12 hours if the land was watered sometime before sowing. About 15 or 16 days after planting the plants are thinned, the operation being repeated later on if the crop is too thick.

III: Time of sowing depends on the purpose for which the crop is grown. If for human consumption in a fresh state, sowing may commence as early as the first half of March, but the ordinary time would be about the beginning of April. If grown for forage during the period of scarcity, after the failure of the Bersim crop, sowings may commence as early as the middle of May to the beginning of September. Grown for grain (the main crop), the seed is generally sown from about the 20th of July and continued for about 1 month. The early sown crop, however, gives the largest return.

V: As said before harvesting depends on the var. grown as well on the purpose for which it is grown. If grown for forage about 35 days are required for the crop to be consumed.

The plant is cut down by means of a small hook; the ears are then removed and exposed to the sun for about 25 days until com-

pletely dry. The grain is generally separated by beating with sticks.

The produce chiefly depends on the amount of manure applied. With a fair dressing of manure about 8 ardebs of seed are obtained per feddan.

VII: Maize is very largely consumed in Egypt in the form of bread, generally mixed with a certain amount of Fenugreek seed. As a food substance it is poor in Albuminoids, somewhat poorer than Wheat or Barley. However, it is richer in fat than both, and on account of its high proportion of fat it is an excellent food for fattening animals. Generally the grain is not used for feeding stock. Occasionally it is employed in the case of hardly working camels and mules, as well as for sheep. Largely used for poultry feeding, pigeon, etc.

The plant is not turned into silage, and the stalks and cobs generally consumed as fuel, the former being largely used as hedge for crops such as tomato, egg plant, cucurbits, etc. The cobs may be crushed and when mixed with other feeding stuffs, used as food for stock. The sheathes of the ears are made into a coarse kind of paper; large quantities of starch are manufactured from the grain, both for laundry purposes, making puddings, etc. and the dried styles and stigmas are used as a diuretic, in medicine.

VIII: No crop, perhaps, pays better to judicious manuring, than Maize. It requires a heavy dressing of manure, the latter being in the most available form. It is found that without manure the crop is a poor one; this is explained by the fact that the plant remains in the soil for such a short period, besides, possessing shallow roots and being a heavy cropper. The amount applied per feddan is sometimes as high as 25 or 30 cub. m. in the case of Coufri, but often as low as half of this. The amount required much depends on the crop preceding maize and in the case of a leguminous plant less manure is required than after a cereal. In the case of Coufri, and under ordinary conditions, from 15—20 cub.m. may be considered as a good dressing of manure.

Maize does not thrive on stiff clays, a loam being best suited to its growth. It does not require much care in preparing the land, but careful thinning, surface stirring and watering.

INDEX

Artichoke, globe,	20	Eddoes	23	Millet, great	5
» , Jerusalem,	37	Eggplant	62	Okra	38
Asparagus	8	Endive	19	Onion	3
Barley	39	Fennel, sweet	34	Parsley	52
Barnyard grass	32	Fenugreek	76	Pea,	
Bean,		Flax	46	» , cajan	15
» black-eyed,	75	Garlic	5	» field	57
» broad	77	Gesse	45	» garden	57
» chinese	75	Gomto	38	» gray	57
» french	52	Gourd, great	27	» pigeon	15
» haricot	52	Gram,		Pepper, pod	16
» horse	77	» common	18	Poppy, Opium	56
» kidney	52	» green	52	Potato,	
» lima	52	Groundnut	7	» common	63
» tick	77	Guinea grass	55	» sweet	42
Beet,		Hemp, Decan	37	Purslane	54
» chard	10	Henna	47	Radish	59
» garden	9	Indian corn	79	Rice	69
Broom corn	72	Indigo	41	Rocket, garden	32
Brussels sprouts	13	Jarosse	45	Safflower	17
Cabbage,		Johnson grass	72	Sedge, foxtail	30
» common	11	Jute, proper	24	Sesame	68
» Savoy	11	Kohl-rabi	13	Sorghum, sugar	72
Cardoon	28	Leek	4	Spinach	65
Carrot	31	Lentil	48	Sugar cane	60
Cauliflower	12	Lettuce	43	Tania	23
Celery	6	Lucerne	51	Taro	23
Chickpea	18	Lupine	40	Teosinte	33
Chicory	19	Maize	79	Tomato	49
Clover	66	Mallow,		Turnip	14
Colocynth	22	» common,	50	Wheat	73
Cotton	34	» Jew's	24		
Cress, garden	44	Marrow, vegetable	28		
Cuba grass,	72	Melon,			
Cucumber,	26	» sweet	25		
Earthnut	7	» water	20		





**HOME USE
CIRCULATION DEPARTMENT
MAIN LIBRARY**

This book is due on the last date stamped below.
1-month loans may be renewed by calling 642-3405.
6-month loans may be recharged by bringing books
to Circulation Desk.

Renewals and recharges may be made 4 days prior
to due date.

**ALL BOOKS ARE SUBJECT TO RECALL 7 DAYS
AFTER DATE CHECKED OUT.**

MAY 1 1977

REC'D CIRC DEPT APR 17 '77 10

DEC 21 1977

REC. CIR. DEC 14 '77

REC. CIR. DEC 14 '77

LD21-A30m-7,'73
(R2275810)476-A-32

General Library
University of California
Berkeley

RB
(C1)

YC 60235



